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# THE ARCHITECTS'



## JOURNAL

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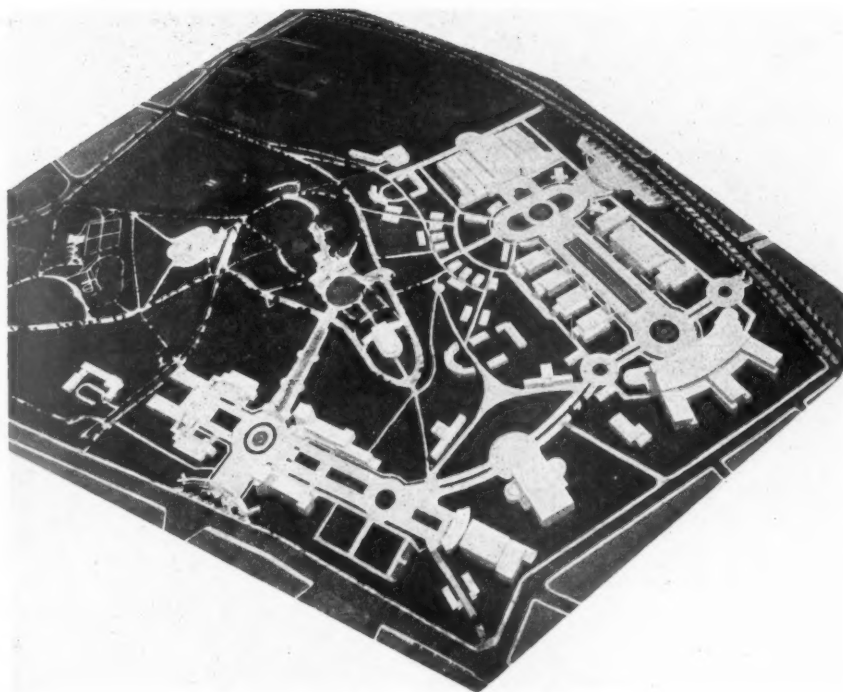
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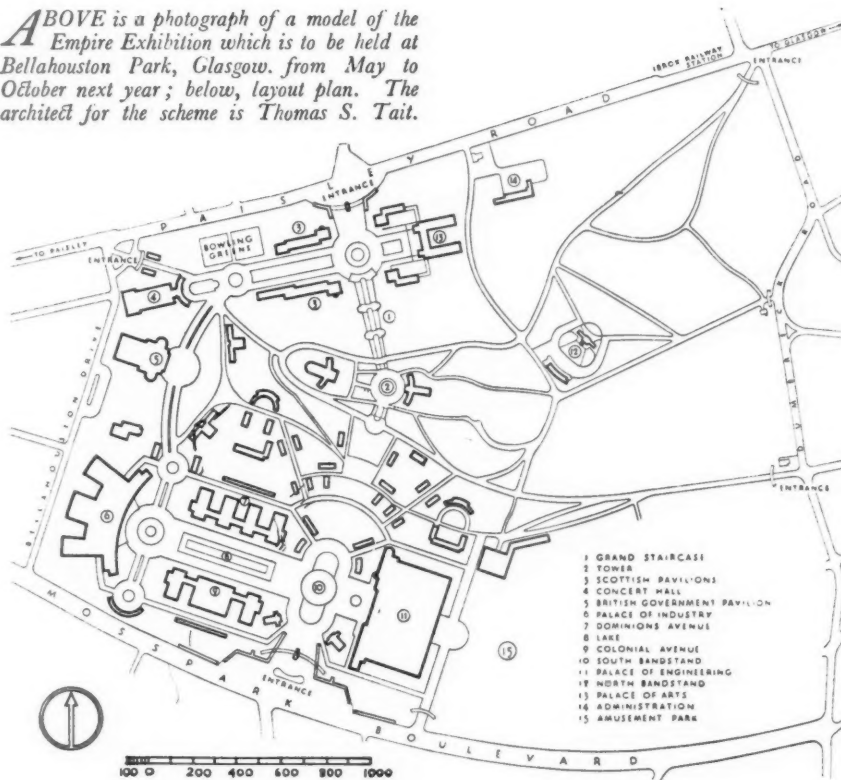
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*The Editor will be glad to receive MS. articles and also illustrations of current architecture in this country and abroad with a view to publication. Though every care will be taken, the Editor cannot hold himself responsible for material sent him.*

EMPIRE EXHIBITION, SCOTLAND  
MODEL OF THE PROPOSED SCHEME



*ABOVE is a photograph of a model of the Empire Exhibition which is to be held at Bellahouston Park, Glasgow, from May to October next year; below, layout plan. The architect for the scheme is Thomas S. Tait.*





## THE NEW ADELPHI

*A perspective drawing, by W. B. Suddaby, of the proposed buildings to be erected on the central site of the Adelphi Estate. Shell-Mex House is shown on the right of the drawing. The design has just been passed by the Crown Lands Advisory Committee. The architect is Stanley Hamp.*





## SIR JOHN HARINGTON AND ALL THAT

THE contents of the greater part of this issue is a subject which illustrates the dangers of convention. Efficient sanitary services are now taken so much for granted that the public in general never even thinks about how fundamental they are; how all social development has been inextricably linked with them and progressed with their progress; how huge are the political inferences to be drawn from such widespread and publicly-maintained organizations; and how much of civilization would come to an end in their breakdown.

The contemporary public, whatever its faults, certainly does wash. The present social system is not generally considered perfect, but it has mastered widespread epidemic disease, its streets are clean and well-drained, and it is rare to find any place of public assembly where somewhat sensitive modern noses are grossly affronted. The magnitude of these felicities is usually only appreciated by Britons during sojourns amongst less enlightened peoples, and is probably felt to have been always the natural birthright of a free democracy. In the event, the majority of free Britons resolutely obstructed every attempt to bring them about. Only fear of disease, the introduction of cold-water supply under pressure, the invention of the water-borne drainage system, and the resolute hard work of now-forgotten sanitary engineers, have made their blessings widespread during the last fifty years.

Society has a short memory for the really great and the really important. Sanitation, moreover, has a double handicap in the struggle for a place in the public mind. Like Ross, Pasteur and de Lesseps, it is constructive instead of destructive, and was therefore bound to make poor going against Dukes Cumberland and Wellington. But, far worse than this, it was, in some of its aspects, not altogether nice. And coming into fuller achievement at a time when to be nice, as far as everyone knew, was the first of keys to a respectable bank balance, everyone had to be very careful indeed about the wonders of good sanitation. On the whole, it was better not to think about sanitation at all except to think how much nicer it was that that kind of thing was not as it once had been.

Conventional, kid-gloved delicacy in handling the facts of sanitation has done more than continue to cause situations of considerable social embarrassment. It has led to a grave distortion of history. The clichés of the history books—"the crowded houses of the poorer classes much facilitated the spread of the disorder" (1666)—have built into a wobbly pyramid of error the public's ideas of past social periods. Charles Laughton's modest attempts to reproduce on

the screen Henry's more pleasing little ways horrified a public which only ate peas with a knife in strict privacy, and would have been mortified beyond belief if any host settled their doubts whether the lavatory was or was not the lavatory.

Before the fullness of the sanitary engineer's contribution to civilization will be recognized by the public, there will have to be some historical plain-speaking. Film fans swarming to the pageantry of "Fire Over England," where hard running in thirty pounds of padded brocade and high-grade hardware does not even make people warm, must learn that in those glorious heart-quickenings times there were only three conveniences in London; and that the Duke of Norfolk who attended the Regent's soirées could only be touched with water when unconsciously unsober. When these things have been first hinted to them delicately and at last absorbed, Britons may have learnt something of social progress and be ready to honour those who made a very large contribution to it.

In the meantime, the article published this week portrays for architects some of the stages in the evolution of the water-closet and the domestic bath. Architects know that the water-carriage method of soil drainage has been known as far back as social records go, and most of them have mastered the principles of the modern water-closet at one stage of their careers, even if their suggestions for remedying defects have generally dwindled thereafter into bending the ball-valve shank. This week some of the more outstanding events in the history of sanitation are mentioned: the struggle to prevent foul air escaping from the drainage system; the first water-closet, immortalized as much by Sir John Harington's prose as by the efficiency of his invention; the first cold water supply under pressure; and the first fitted baths to be in general use.

And more interesting today than stages in sanitary development which have been long surpassed are the changes in the public's attitude towards hygiene. The refusal to recognize and attempt to conceal the whole problem of human waste matter which is exemplified by the decorated and tightly-closing commode was succeeded by the bathroom with carpets, plants and fittings encased in panelling. Today there seems something typical of the Victorians in their readiness to put up with insanitary recesses rather than to allow functionalism to verge upon the blatant.

Mr. Lamb's article again emphasizes the melancholy truth that the architect must convert the public before he is allowed to do what is best for it. For instance, we still have to convert our clients to using the 13-in. water-closet.



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## N O T E S & T O P I C S

MR. HOLDEN AT THE A.A.

I HAVE had a good many things to say from time to time about architectural education; this week, however, it is the *Architecture of Education* which has been drawing attention to itself in one way and another. It all began on Tuesday evening with Mr. Holden's address to the A.A. on his own building for the University of London. Mr. Holden was very aware of the overwhelming importance of his job and of his responsibilities to posterity.

I have always had an enormous respect for Mr. Holden, respect for the natural modesty and charm of the man, as well for his ability as an architect. The brilliance of his University plan, combining as it does, fine architectural grouping with complete flexibility is rivalled only by the tremendous care taken over the minutiae of structural detail.

However, I am still unrepentantly sceptical about Mr. Holden's use of solid construction. The theory about the life of steel over centuries being an uncertain factor, does, after all, rather break down when one remembers the reinforcing rods buried away in the piles. Also, granting that our modern ideas about daylight may be a little excessive, is it not, nevertheless, the architect's duty to provide all the light that he can in rooms where work will have to be done?

NASA . . . .

A most fascinating little journal has just come to my notice—*Nasa*—or in full, *The Journal of the Northern Architectural Students' Association*. It seems to be an excellent example of co-operation amongst students of architecture in different universities, a horizontal section instead of a vertical one through a stratum of education.

. . . . AND EDUCATION

The most interesting contribution was a joint one on Architectural Education, by Professor Budden, Mr. Summerson

and M. Corbusier. Professor Budden sums up most admirably the course which the schools have travelled during the last quarter of a century, and lays full stress on the changes from the fact that the architect has become the servant of the community rather than of the private client.

This change from patron to community was always dreaded by a section of the profession, I could never understand why. After all, as Professor Budden says, "school training . . . has become both more serious and more vital." Mistakes, of course, there will always be, but, as I have said before, there has been a big change in the schools in recent years, a swing towards something more real and more sincere. Outwardly it may irritate some people because it is inevitably tinged with a good deal of politics but, to quote Professor Budden again, "School training has tended more and more to be concerned with the permanent realities of architecture, it has been informed with a higher purpose."

In my own student days, left to ourselves, we probably plunged into theatre décor or smart West End restaurant stuff. Today it may be anything from a slum clearance project to a health centre. It may all be very earnest and the *esquisses* may be less "splashy," but the attitude of mind is symptomatic and probably more realistic. At any rate it promises far, far more in the way of ultimate achievement.

SCHOOLS COMPETITION

There is no doubt in the minds of the younger generation, at any rate, about what the *Architecture of Education* should be like. The *News Chronicle* Schools have had their due of publicity, but I had another look at the "final round" drawings when I visited Bond Street on Friday, and one thing struck me very forcibly. The "soap box" and "operating theatre" type of criticism is quite definitely out of date. If this competition does nothing else it will show that the cosmopolitan modern movement and the romantic revival are absorbing each other. "Landscapey" planting, colour and very free shapes are all hard at work getting married to functionalism, the proportion of successful marriages being much as in real life.

MR. W. T. PLUME, HON. A.R.I.B.A.

Decade after decade the spare, dynamic figure of Mr. W. T. Plume, who after forty-two years has just retired from the Editorship of *The Builder*, has been part of the pattern of every architectural function.

Outwardly somewhat dry and precise, he has long hoodwinked the world into accepting him as the monument to the safe and the academic which he is not. Behind that mask lurks the iconoclasm of a youthful mind . . . in the time that it takes to eat a plate of beef at Simpson's he once converted me to Social Credit, and this was in the days when Social Credit was unknown to anybody but Major Douglas and Mr. Eamon O'Duffy. Mr. Plume knew all about it. Furthermore, he could explain it—in limpid prose.

. . . . AND CHAIRMAN MALGRÉ LUI

The appointment of Mr. John Summerson as Chairman of the R.I.B.A. Junior Member's Committee is a move



*John Summerson, Chairman of the Junior Members' Committee.*

of high diplomacy. I suspect that the high ups in the R.I.B.A. Council tend to look on the Junior Members as a lot of tiresome young men interested only in "isms," but Mr. Summerson has the mental agility to be gracefully Machiavellian, coupled with the solid scholarship which produced his book on Nash—a combination which should enable him to put across the Junior Members' opinions in a form not too shocking to the gentlemen upstairs.

\*

My photograph shows him about to start work, yet not too resentful at being interrupted. He is, in his own words "on the editorial staff of the leading English architectural weekly," which lies on the table in front of him. It is, you will observe, not THE ARCHITECTS' JOURNAL.\*

#### OXFORD

Mr. Cyril Connolly has, I see, been examining the architecture of another University. The home of lost causes has smashed all its traditions this week and has, politically, gone left. Its architecture has not, so far, followed suit. Mr. Connolly has discovered a "Cotswold revival" and is not very pleased either with Campion Hall or with the "American clap-board look" of the new Nuffield Bequest buildings. Cambridge may be a bit chaotic, but on individual modern buildings it can give Oxford a good many points and still win.

\*

By the way, it is rather tragic that so many of us when we speak of Oxford still really mean that pathetic little mediæval nucleus which bears about as much relationship to the true Oxford as the City and West End do to the true London.

#### AND COVENTRY

This appalling facility which the motor trade seems to have for settling down in the wrong spot extends from petrol pumps to whole groups of out-size factories. My business took me to Coventry this week, in its way a repetition of the Oxford tragedy—an exceptionally perfect, if

[\* It is, not to equivocate, *The Architect and Building News*.—ED. A.J.]

small, mediæval core with a complete aura of Morris, Humber, Alvis, etc., for a mile or so each way. I suppose that it was all very necessary and that it grew gradually out of the bicycle trade of thirty years ago, but one would have thought that a little control, a little zoning on Coventry's part would have shown a greater awareness of heritage than would the Peeping Tom cafés which greet one in the main street.

#### THE MENAI BRIDGE IN DANGER

It was with a shock of horror that one read of the Minister of Transport's bland announcement in Parliament last week, that he intended to rebuild the Menai Suspension Bridge. One had felt somehow (though the Government's record does nothing to justify such confidence) that so unique a monument as Telford's masterpiece—the greatest engineering achievement of an era when English engineers led the world—would be respected.

\*

Fortunately, on further inquiry one finds that the Minister, very magnanimously, does not propose to destroy the bridge altogether; only to reconstruct it with new cables and wider carriageways.

\*

The public (and architects and engineers particularly) should demand two things :—

1 : That an exact statement of how the appearance of the bridge will be altered by the proposals be made by the Minister, and competent opinion be given the chance to approve of it before work begins.

2 : That when the reconstruction is finished the bridge be scheduled as an Ancient Monument, as a permanent safeguard.

\*

It is, of course, a national scandal (indeed an international scandal) that the Menai Suspension Bridge was not scheduled as an Ancient Monument many years ago; but then to the official mind "monument" means ecclesiastical and "ancient" means gothic or earlier.

#### RESEARCH AT THE BUILDING CENTRE

This is a most useful exhibition—I say useful advisedly, because I felt edified rather than entertained. It was pretty stiff going, but its value to the architect lies, of course, not in its actual exhibits, but in that it draws attention to the kind of research that is being done.

\*

The laboratories, on their side, must keep in touch with the architect if they are really to fulfil their function. There was, for instance, an astonishing range of British marbles but no information, apparently, as to their wearing qualities and the sizes in which they can be obtained—two essential points. The acoustic section was admirably staged and included some working models whereby one could test the qualities of absorbents, etc., by pushing buttons—South Kensington fashion. These toys relieved the almost inevitable monotony which belongs to an exhibition of this type.

ASTRAGAL

*As this issue is almost entirely devoted to an historical survey of Sanitation the usual weekly features of Shops, Current Buildings and Trade Notes are held over. They will be resumed next week.*



## NEWS

POINTS FROM  
THIS ISSUE

- "Kid-gloved delicacy in handling the facts of sanitation has done more than continue to cause situations of considerable social embarrassment" .. 371
- "The Minister of Health has allowed the appeal of Serge Chermayeff, against a decision of the Uckfield Rural District Council refusing him permission to build a house at Hallan, near Cuckfield, the plans of which were submitted for the approval of the Council" .. 374
- "In Letchworth the chances are about 10 to 1 against any bomb, well aimed at the town, falling upon any dwelling" .. 375
- Sanitation: An Historical Survey .. 385

## THE ROYAL GOLD MEDAL

Intimation has been received that His Majesty the King has approved the award of the Royal Gold Medal to Sir Raymond Unwin, Hon. LL.D., F.R.I.B.A., in recognition of the merit of his work as an architect and town planner.

The medal will be presented at a general meeting of the Institute on Monday, April 12, at 8.30 p.m.

ROME SCHOLARSHIP IN  
ARCHITECTURE

The Faculty of Architecture of the British School at Rome has admitted the following candidates to the competition for the Rome Scholarship in Architecture, 1937:—

D. W. Aberdeen, A.R.I.B.A. (London University); J. Armstrong, B.A.R.C. (Liverpool University); H. Bennett, A.R.I.B.A. (Manchester University); K. Easton (Armstrong College, Newcastle-on-Tyne); A. H. B. Jones (Architectural Association); G. A. Lyall, A.R.I.B.A., and J. Ogilvie (Edinburgh College of Art); A. Paton (Glasgow School of Architecture); D. P. Reay, B.A.R.C. (Liverpool University); D. W. Roberts, A.R.I.B.A., and H. E. A. Scard (Welsh School of Architecture, Cardiff); E. C. Scherrer, A.R.I.B.A. (Manchester University); S. W. J. Smith (Royal Academy Schools); N. P. Thomas (Welsh School of Architecture, Cardiff); W. T. C. Walker and P. R. Whiston (Edinburgh College of Art); and F. White (Leeds School of Architecture).

HOUSE AT HALLAND: APPEAL  
UPHELD

On Monday last the Minister of Health announced that he had allowed the appeal of Mr. Serge Chermayeff, F.R.I.B.A., against a decision of the Uckfield Rural District Council refusing him permission to build a house for his own occupation at Halland, near Cuckfield, the plans of which were submitted for the approval of the Council. The plans were rejected by the Council on the ground that the house would not be in keeping with the character of the neighbourhood. The powers exercised by the Council were those conferred on local authorities under the Town and Country Planning Act. A public inquiry in connection with the matter was held at Crowborough last

THE  
ARCHITECTS'  
DIARY

## Thursday, March 4

R.I.B.A., 66 Portland Place, W.1. Exhibition: "Airports and Airways." Until March 24. 10 a.m. to 8 p.m. (Saturdays, 10 a.m. to 5 p.m.). ROYAL ACADEMY, Burlington House, W.1. Exhibition of British Architecture. 10 a.m. to 8 p.m. March 5 and 6 (last day): 10 a.m. to 6 p.m. ARCHITECTURAL ASSOCIATION, 36 Bedford Square, W.C.1. Exhibition of examples of Industrial Planning throughout the World. Arranged by the A.A. School of Planning. Until March 12. Also, second of a series of talks to Junior Members. "The Architect and the Work of the Building Societies." By Stanley C. Ramsey. 8 p.m. ARCHITECTURE CLUB, Supper. Discussion. At the Florence Restaurant, Rupert Street, W.1. Subject: "Is there a Modern English Architecture?"

AUCTIONEERS' AND ESTATE AGENTS' INSTITUTE, 29 Lincoln's Inn Fields, W.C.2. "Agreement Agreements v. Hire Purchase." By H. F. Finn-Kelley. 7 p.m.

INSTITUTE OF HEATING AND VENTILATING ENGINEERS, Liverpool and District Branch. At 312 India Buildings, Water Street, Liverpool. "The Erection of some Heating and Ventilating Installations." By H. E. P. Ashford. 7 p.m. BUILDING CENTRE, 158 New Bond Street, W.1. Exhibition: "Science and Building" until March 25. 10 a.m. to 6 p.m. (Saturdays, 10 a.m. to 1 p.m.).

## Friday, March 5

ROYAL SOCIETY OF ARTS, John Street, Adelphi, W.C.2. "Excavations at Clanhugh-dara." By E. J. Mackay. 4.30 p.m. L.C.C. SCHOOL OF BUILDING, Ferndale Road, Brighton, S.W. Exhibition of work and distribution of prizes, by S. P. Parkiss-Gunn. 7 p.m.

## Monday, March 8

R.I.B.A., 66 Portland Place, W.1. "Town and Country Planning under the Act." By G. L. Pepler; and "The Working of the Advisory Panels System." By G. H. Jack. 8 p.m. HOUSING CENTRE, 13 Suffolk Street, S.W.1. "Warmer Homes." By H. L. Pirie. 9.30 p.m.

## Tuesday, March 9

CHADWICK TRUST, At Gray's Inn Hall, Holborn. "Legal Aspects of Sanitary Science." By W. T. Crewell. 8.15 p.m.

January, when an inspector of the Ministry of Health heard evidence from interested parties.

A photograph of a model of the house was published in our issue for February 18.

£1,221,000 AIR BASE AT  
PORTSMOUTH

The Portsmouth City Council has adopted a scheme for establishing an Empire flying-boat base at Langstone Harbour. The cost will be £1,221,452. The scheme provides for landlocking the harbour by barrages and reclaiming enough land to make a 600-acre aerodrome at Farlington.

## EUSTON STATION

New details about the rebuilding of Euston Station, on which Mr. Percy Thomas, F.R.I.B.A., is consultant architect, were given by Sir Josiah Stamp, chairman of the London, Midland and Scottish Railway Company, at the annual general meeting on Friday.

"The scheme," Sir Josiah said, "will involve the demolition of all the buildings between the station and Euston Road, in order to enable the platforms to be lengthened, and the erection of new station buildings, an hotel and a block of offices in a new alignment. The internal accommodation of the station, including the concourse, booking office, waiting-rooms, refreshment rooms, cloakrooms, and other amenities will be planned within the east-west limits of Seymour Street and Melton Street.

"The proposed plans locate the new parcels offices for dealing with both outwards and inwards traffic and the mails at the north end of the station, such traffic to

be worked to the platforms by means of an overhead bridge, minimizing contact with the travelling public and removing a source of present inconvenience.

"Considerable progress has been made with the details of the planning, and it is hoped to begin the work during the present year. In fact the important consequential rearrangement of our marshalling and train equipment facilities at Willesden is already in hand. When the reconstruction is complete, Euston will be a worthy replacement in modern terms of the present station, which has existed with various adaptations for just a century."

£100,000 HOSPITAL FOR  
MANCHESTER

A new dental hospital and school, costing £100,000, are to be built in Manchester. This sum is to be provided as a gift by Mr. Samuel Turner, formerly High Sheriff of Lancashire. The new buildings will adjoin the university.

MENAI BRIDGE TO BE  
RECONSTRUCTED

The Menai Suspension Bridge, Anglesey, designed by Telford and opened 110 years ago, is to be reconstructed at a cost of £228,000. The main features of the bridge will be preserved. The principal differences will be that there will be fewer chains, and footpaths will be provided on either side outside the suspenders.

## THE PLANNING OF LIBRARIES

On Wednesday, March 24, at the monthly meeting of the London and Home Counties Branch of the Library Association, the plans of a number of new municipal libraries will be exhibited and discussed. The discussion will be opened by Mr. E. J. Carter and Mr. J. E. Walker, F.L.A. The meeting will be held at Chaucer House, Malet Place, W.C.1.

ARCHITECTS' REGISTRATION:  
"UNATTACHED" REPRESENTATIVES'  
ASSOCIATION

The result of the recent election of representatives of the "unattached" registered architects to serve on the Registration Council has now been notified to the successful candidates, who are the following:—Messrs. H. Baily, D. W. Beck, E. W. Chapman, E. J. Elford, L. G. Head, W. O. Hudson and G. W. Jackson.

All those elected, with the single exception of Mr. E. J. Elford, were the candidates recommended by the Representatives' Association.

## APPOINTMENT

Mr. Alwyn A. S. Fidler, M.A., B.A.R.C., A.R.I.B.A., has been appointed architect to the Land Settlement Association, whose headquarters are in Westminster. Mr. Fidler will be responsible for architectural developments in various parts of the country and will be particularly concerned with the new schemes sponsored by the Commissioner for the Special Areas. Under these schemes, families from the distressed areas will be settled in more prosperous districts. It is intended that the heads of the families thus transferred shall find occupation in managing gardens of approximately half an acre, while the younger people obtain employment in the district.

## DINNER TO ALDERMAN PIKE

A dinner in honour of Alderman A. T. Pike was given by the Garden Cities and Town Planning Association at the Criterion Restaurant, W.1, on Friday last. Alderman

*A perspective drawing of the design, by Robert Cromie, for the new Prince of Wales Theatre in Coventry Street, Piccadilly. It will be nearly twice as large as the old building, now almost demolished. The new building, estimated to cost £350,000, will be opened in August.*



Pike recently resigned the secretaryship of the Association—which position he had occupied for the past seventeen years—to become secretary of the British Housing Corporation, Ltd. Sir Raymond Unwin, who presided, referred to the precautions which were now being made to defend ourselves against attack from the air. It became, he said, the duty of the Association to point out the overwhelming advantage of the garden city as a place of refuge in an air raid. He continued: "In Letchworth the chances are about 10 to 1 against any bomb, well aimed at the town, falling upon any dwelling. In many parts of London the chances must be 2 to 1 against any bomb, equally well aimed, not falling on a house. In Letchworth if one bomb in ten does hit a dwelling, it will be one dwelling. In London if a bomb falls on a dwelling, it may find three, five or eight dwellings piled one on another to suffer its deadly effect. It is therefore obvious that in raising the height of buildings 20 per cent. we add that percentage to the danger risk."

Sir Raymond pointed out that the garden city principle was the only method yet available which could distribute the population rationally and provided the greatest opportunity for social organization, for efficiency of production and for safety from air attack.

Other speakers included: Messrs. Cecil Harmsworth, John Parker, M.P., F. J. Osborn, Gilbert McAllister, and Alderman Pike.

#### GARDEN CITIES AND TOWN PLANNING ASSOCIATION

Mr. G. L. Pepler, speaking at the conference on "Planning and Decentralization," held under the auspices of the above Association at the Housing Centre last Saturday, said that for thirty-eight years the garden city ideal had been before them, and for twenty-eight years the association had been planning legislation. In those

years they had produced two garden cities, Letchworth and Welwyn, and one satellite town, Wythenshawe.

Today the layout of estates had improved, housing standards had advanced, local and regional road systems were more coherent in pattern, air transport was being taken into account, and greater care was being taken over health, convenience, and amenity. The trouble was that things could have been more effective if there had been a clearer recognition of the relationship between town and country and home and workplace. Whatever planners thought or suggested, their schemes could only endeavour to implement the policies adopted by the councils responsible for carrying them out, and if people could be convinced that a principle was right and of first importance, they would disregard fears and conquer the difficulties.

#### L.C.C. AND WATERLOO BRIDGE

At last Tuesday's meeting of the London County Council the Chairman of the Highways Committee stated that tenders were shortly to be invited for building the new Waterloo Bridge. He stated that the design of the bridge was approved generally on October 23, 1934, and that his Committee had given further consideration to certain details. "The bridge as designed will consist of five spans, each of about 238 ft., compared with 120 ft. in the former bridge. The first and last piers will be placed out in the river, clear of the Victoria Embankment and of any future embankment on the south side of the river. The main characteristic of the architectural design is the wide span and shallow rise of the arches, which has the effect of reducing bulk to a minimum and producing a light and graceful appearance. The northern arch will allow the Victoria Embankment to run through in an uninterrupted sweep, and this is of considerable aesthetic value.

"Each span will consist of twin arches,

side by side, with a flat soffit, 33 ft. wide, between them; the result of this treatment will be to produce a lighter and more pleasing effect than could be obtained by a single arch of great width, which would give a somewhat heavy and tunnel-like appearance, and a striking view will be obtained from the north to the south bank under the bridge, the vista being closed at the south end by some columns and other features taken from the old bridge. The piers will be faced with granite, up to a level slightly above high-water mark, their upper portions being faced with Portland stone. The arches and the flat soffit referred to above will be of reinforced concrete, the surface being treated by chiselling or grinding in such a way as to expose the aggregate, thus obtaining a satisfactory colour. The spandrels of the arches, forming the main outer faces of the bridge, will be faced with Portland stone. There will be a moulded cornice and parapet of Portland stone, the parapet being surmounted by white bronze balustrading, with lamp standards of the same material. The height and open character of the balustrading will be such that an uninterrupted view of the river will be obtained. At each abutment two stairways will be provided. Those at the north end will lead to the Victoria Embankment and will be connected by a pedestrian subway beneath Wellington Street, and those at the south end will lead to the foreshore and will be designed to suit a possible future embankment. The question of surmounting the pedestals at the four stairways with sculpture is under consideration. The removal of the present projecting embankments and masonry masses on the Victoria Embankment adjoining the old bridge has been allowed for and the embankment wall and parapet will be re-formed to give an uninterrupted line. The lighting of the bridge, the width of the carriageway and footways and the provision of a central strip remain to be settled and will be the subject of discussion with the Ministry of Transport."

At the same meeting the Housing and Public Health Committee submitted proposals for the erection of 340 new flats in London to accommodate about 1,720 persons at a cost of £190,000. The proposals included:

- (1) The construction of over 100 flats, with accommodation for about 520 persons, in Colwyn Street, Lambeth, at an estimated cost of £62,630.
- (2) Acceptance of a tender for the erection of ten blocks of flats, containing about 240 flats to accommodate nearly 1,200 persons, in Pembury Road, Hackney, at an expenditure estimated at £127,560.

#### GENERAL POSITION IN THE BUILDING INDUSTRY

"The position of the building industries continues to be satisfactory, allowing for normal seasonal influences," states the current issue of *The Building Industries Survey*. "January usually marks the low point of the seasonal movement of activity, and the weather has not been unduly inclement as it was last year.

"The value of plans passed by 146 provincial urban authorities for dwelling-houses continues to show a downward tendency, but activity is maintained, and the number of houses completed and under construction by local authorities is much above the level of the corresponding period a year ago. The activity of private enterprise in the spring, however, will largely



depend on the plans passed during the third quarter of 1936, which, in the sample of 146 towns, were less in value than in the preceding year.

"Activity in connection with industrial and commercial building is at a high level, and the building plan figures foreshadow further increases. This reflects not only the favourable view generally taken of the future profitability of trade and industry, but also the effects, direct and indirect, of the defence programme.

"The other non-residential categories also show favourable indications for the future, and there is little doubt that any decline that may occur in private enterprise housing activity during the next six months will be more than compensated by increased building by local authorities and by greater activity in non-residential construction.

"Public works contracting is in a much better position than at this time last year, and during 1936 has made up most of the decline of the three previous years. The statistics of loans sanctioned for public works show that activity may be expected to increase further in the spring, and special schemes for road improvement, London transport, etc., provide a reserve of works coming into operation.

"The outlook for the materials industries continues favourable especially for materials used in the larger structures. In some cases these will also be affected by increased public works activity. Pressure on steel supplies, particularly of structural descriptions, is understood to be increasing, and there is a growing shortage of scrap. Continental countries have been reported to be unwilling to export such large tonnages of crude steel to make up the deficiency in home production as they have recently supplied under the special arrangement to increase the import quotas into this country of cartel countries."

#### ANNUAL DINNER

The annual dinner of the Polytechnic Surveyors' and Auctioneers' Association is to be held at the Florence Restaurant, Rupert Street, W.1, on Wednesday, April 7. Tickets are obtainable from Mr. R. E. Brown, F.A.I., of Messrs. J. Ewart Gilkes and Partners, 2 Hans Road, Brompton Road, S.W.3, or Mr. H. Rona, A.A.I., of Messrs. Ethell and Partners, 14 Waterloo Place, S.W.1. (Cost of tickets: 10s. 6d. for members; and 6s. 6d. for junior members and students.)

#### ANNOUNCEMENT

Messrs. Eric Cole and Partners, F.R.I.B.A., of Cirencester, in conjunction with Messrs. L. W. Barnard and Partners, of Cheltenham, will be pleased to receive trade catalogues, etc., at Market Place, Faringdon (Tel: 99), where they are opening a new branch office.

### EXHIBITIONS

The Exhibition of French Painting at Rosenberg and Helft's Galleries is very good. It is not quite fair to compare it, as is perhaps intended, with the English contemporary painting, which immediately preceded it, for most of the work shown is by acknowledged masters.

In reviewing the painting of the great French Impressionists two things remain surprising. One that Gauguin should

still be found hanging in an exhibition of this standard. The other, that Van Gogh should be the only painter almost universally understood and appreciated. About ten years ago would-be intellectuals began to hang reproductions of his pictures in their rooms. Today he is to be found in homes where no other modern painter would be tolerated. It is difficult to analyse that quality in his painting which makes him so undeniably easier to interpret than Cézanne or Renoir.

This is an important exhibition, and definitely worth seeing, because it consists entirely of good, but not too well-known works. Cézanne's "Tête de Jeune Garçon" and his "Usines près de St. Victoire"—a very early work, painted in 1870. Van Gogh's "La Pluie," a lovely thing that seems perhaps even better than it really is, because it has not suffered, as so much of his work has, by constant and bad reproduction. Pissarro's slight crayon drawing which gives all the atmosphere of the Boulevard Clichy. Two groups of dancers by Légas, and two early, and a magnificent later, Rosier, Renoir. The hanging and lighting at this gallery are so good that each picture keeps its full value.

There is an interesting exhibition of English painting at 'Tooths', covering some of the best contemporary work. All the pictures are for sale on the hire-purchase system, and this seems a good idea, for pictures are perhaps the last luxuries in every budget, and few people—very few of those who really care for such things—can immediately produce the necessary purchase price.

All the work is of a high standard. Particularly notable are R. O. Dunlop's "Ferry Steamer," May Potter's "Thames at Chiswick," for which she uses what one has come to think of as Nash's palette with a completely individual result, Keith Baynes's "Landscape, North Spain," John Nash's "The Road up to Whiteleaf," though perhaps he does this sort of thing rather often, and sometimes better, Duncan Grant's "Thames Wharves," and many others.

Agnew's are holding their annual exhibition of watercolour and pencil drawings. These range from Filippino Lippi to the present day. Of outstanding interest are Titian's "Monk," David Cox's "Hay-making," and a charming sketch of the Seine by John Nash, the architect. Two Degas drawings hold the middle distance, while Paul Maze and Robin Darwin seem far the best painters in the immediate foreground of today.

At the Storrans, three young painters, Victor Pasmore, Claude Rogers, and Thomas Carr, are holding a joint exhibition of their painting. Their work is very similar in outlook and technique and the style of all three is definitely formed, though at first sight it appears very free. Claude Rogers is perhaps the most interesting painter of the three, and his "Dining Hall" is extremely good.

D. COSENS

Exhibition of French Painting. Rosenberg and Helft, 31 Bruton Street, W.1. Till the end of March.

Contemporary British Painting. Tooth's Galleries, 155 New Bond Street. Till March 13.

Annual Exhibition of Watercolour and

Pencil Drawings. Agnew's, 43 Old Bond Street. Till the middle of March.

Recent Paintings by Victor Pasmore, Claude Rogers, and Thomas Carr. Storrans Gallery, 106 Brompton Road. Till March 25.

### OBITUARY

#### JOHN BEGG

We regret to record the death of Mr. John Begg, F.R.I.B.A., F.R.I.A.S., of Edinburgh. He was 71 years of age.

Mr. Begg was born at Bo'ness and educated at Edinburgh Academy and the R.A. Schools. He was the Pugin Student of the R.I.B.A. in 1891, Ashpitel Prizeman in 1891, and Silver Medallist (Essays) in 1894. He was articled to the late H. J. Blanc, F.R.I.B.A., of Edinburgh, and, after serving in the offices of the late Alfred Waterhouse, R.A., and R. W. Edis, F.S.A., he was appointed architect to the Real Estate Corporation of South Africa, a post he held for three years. In 1901 Mr. Begg was appointed consulting architect to the Government of Bombay, which position he occupied until 1908. Later, he took up the position of consulting architect to the Government of India. After serving in that capacity till 1921, he retired and returned to Edinburgh, where he took up private practice and was also appointed Head of the Edinburgh College of Art. Mr. Begg later served as President of the Edinburgh Architectural Association and President of the Royal Incorporation of Architects in Scotland.

Among the principal buildings for which he was responsible are:—Bombay General Post Office, the Lady Hardinge Medical College and Hospital at Delhi, the Nagpur General Post Office, and the William Moore operating theatres, Bombay; while in Edinburgh he was architect for numerous houses, and notably for the Grassmarket housing scheme of Edinburgh Corporation.

#### W. B. FLETCHER

We regret to record the death of Mr. William B. Fletcher, F.R.I.B.A., of Biram and Fletcher, of St. Helen's, Lancs. He was 52 years of age.

Mr. Fletcher received his architectural education at St. Helen's School of Art and St. Helen's Municipal Technical School, the Royal College of Art and the University of London, and was articled to Mr. Frank S. Biram. Mr. Fletcher was responsible for the design of numerous buildings in the district, including the whole of the schools and technical instruction centres erected by the St. Helen's Education Authority.

#### H. J. LEANING

We regret to record the death of Mr. Henry John Leaning, F.S.I., which took place at his home at Hampstead on February 17. Mr. Leaning was a partner in the firm of Messrs. John Leaning and Sons, Chartered Quantity Surveyors, of John Street, W.C.

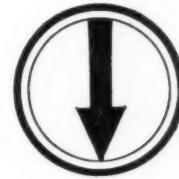
We are informed that the practice will be continued by his surviving partners, Messrs. F. C. Thompson and E. W. Leaning.

#### AN ARCHITECT'S WILL

Mr. Alfred Roberts, F.R.I.B.A., of 4 Vanbrugh Park Road, Blackheath, architect, rating surveyor to Greenwich and Deptford Councils, left estate of the gross value of £44,451 (net personalty £4,273).

# INFORMATION SHEET SUPPLEMENT

The Architects' Journal Library of Planned Information



**R**ECENT developments have brought up for reconsideration the question of the looseness of Information Sheets.

When the series was first started, it was felt that readers of the Journal would have some grounds for complaint if in a feature that was clearly meant for it, no facilities for filing were provided: and the Sheets were therefore inserted loose in the paper.

This method has obvious advantages for filing, but it has also obvious disadvantages, which our readers have not been slow to point out.

As a permanent feature, loose inserts are a nuisance in a paper, since they have a way of dropping out in the street or the train, if not before they get into the reader's hands (we have periodical complaints that Information Sheets for such a week have not been delivered with the paper).

Or, what is nearly as bad, they have a way of sticking out slightly, and getting bent or torn.

Furthermore, those architects who collect the sheets, and there are a great many, are often human enough to delay the act of filing for several days after receiving their copies, in which time the sheets again have a good chance to commit literary hara-kiri.

For all these reasons, it has been decided to make an obvious improvement.

By binding in the Information Sheets in the Journal so that they cannot fall out, their powers of self-destruction will be curtailed. And to insure that they can be as readily filed as before, the pages are now being perforated.

## INFORMATION SHEETS

**4 7 8** Approximate Estimating—V

**4 7 9** Flat Roof Coverings

**4 8 0** Approximate Estimating—VI



**Sheets Issued since Index :**

- |  |   |
|--|---|
| 401 : Plumbing to Baths                  | 454 : Places of Public Entertainment—VII  |
| 402 : Waterproofing                      | 455 : Places of Public Entertainment—VIII |
| 403 : Asbestos-aluminium Foil—I          | 456 : Ellipses                            |
| 404 : Roofing                            | 457 : Roofing                             |
| 405 : Joinery                            | 458 : Sanitary Equipment                  |
| 406 : Asbestos-aluminium Foil—II         | 459 : Hoods and Canopies                  |
| 407 : Roofing                            | 460 : Expansion Joints                    |
| 408 : Joinery                            | 461 : Roof Pitches, etc.                  |
| 409 : Rubber-faced Building Slabs        | 462 : Gas Refrigerators—I                 |
| 410 : Places of Public Entertainment—II  | 463 : Asbestos Cement Rubber Floor Tiles  |
| 411 : Electric Switchgear                | 464 : Approximate Estimating—I            |
| 412 : Lead Soakers to Valleys            | 465 : Gas Refrigerators—II                |
| 413 : Plumbing in Welded Copper Pipe     | 466 : Approximate Estimating—II           |
| 414 : Electric Switchgear                | 467 : Gas Refrigerators—III               |
| 415 : Electric Switchgear                | 468 : Approximate Estimating—III          |
| 416 : Insulating Board                   | 469 : Gas Refrigerators—IV                |
| 417 : Work on Glass                      | 470 : Stopstara Glazing Compound          |
| 418 : Plumbing in Welded Copper Pipe     | 471 : Gas Cookers                         |
| 419 : Places of Public Entertainment—III | 472 : Lead Insulation against X-Rays      |
| 420 : Tentest Metal Cover Strip          | 473 : Electrical Equipment—I              |
| 421 : Wood Preservatives                 | 474 : Asbestos-Cement Ventilating Ducts   |
| 422 : Welding Sheet Copper Work          | 475 : Asbestos-Cement Glazed Panels       |
| 423 : Garages and Drives—II              | 476 : Approximate Estimating—IV           |
| 424 : Roof Glazing                       | 477 : Monel Metal Sink Units              |
| 425 : Places of Public Entertainment—IV  |   |
| 426 : Asbestos-cement Roofing Tiles      |   |
| 427 : Asbestos-cement Roofing Tiles      |   |
| 428 : Welding Sheet Copper Work          |   |
| 429 : Flat Roofing                       |   |
| 430 : Asbestos-cement Roofing Tiles      |   |
| 431 : Automatic Boilers                  |   |
| 432 : Plumbing                           |   |
| 433 : Places of Public Entertainment—V   |   |
| 434 : Plumbing                           |   |
| 435 : Lifts—I                            |   |
| 436 : Lead Soakers to Hips               |   |
| 437 : Coloured Cement Renderings         |   |
| 438 : Wallboards                         |   |
| 439 : Wall Finishes                      |   |
| 440 : Roofing                            |   |
| 441 : Sash Operating Gear                |   |
| 442 : Roofing                            |   |
| 443 : Wallboards                         |   |
| 444 : Rainwater Goods and Fittings—I     |   |
| 445 : Roofing                            |   |
| 446 : Rainwater Goods and Fittings—II    |   |
| 447 : Bathroom Cabinets                  |   |
| 448 : Roof Glazing                       |   |
| 449 : Places of Public Entertainment—VI  |   |
| 450 : Telephone Cabinets                 |   |
| 451 : Hardboard                          |   |
| 452 : Escalators                         |   |
| 453 : Automatic Boilers                  |   |







## APPROXIMATE ESTIMATING:

## FOUNDATIONS.

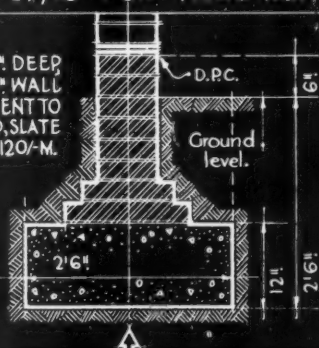
PRICES ARE THOSE  
CURRENT DURING  
JANUARY 1937.

The following are approximate prices per yard run for foundations. Prices are for a medium sized job in the London area and include for over head charges & profit. Measurements should be taken along the centre lines of walls.

## TYPE A: 27/10 PER YARD RUN.

EXCAVATION 2'6" DEEP  
12" CONCRETE, 9" WALL  
IN STOCKS IN CEMENT  
TO 6" ABOVE GROUND, SLATE  
D.P.C., FACINGS P.C. 120/-M.

Structure above  
D.P.C. is not  
included in price.



## TO TYPE A, ADD FOR: (per yard run).

- 12" Extra height of brickwork above ground. . . . . 4/9.  
do. do. facings. . . . . 1/8.  
12" Extra depth of trench and brickwork. . . . . 7/3.  
3" Extra thickness of concrete and excavation. . . . . 2/4.  
Longitudinal reinforcement per 3/4" rod. . . . . 8d.

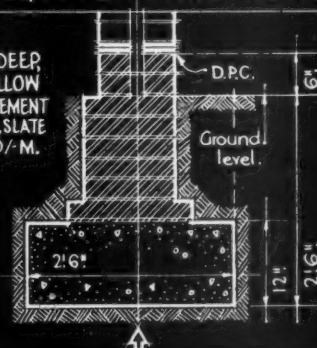
## OMIT FOR:

- Deduction of facings. . . . . 1/3.

## TYPE B: 32/10 PER YARD RUN.

EXCAVATION 2'6" DEEP  
12" CONCRETE, 11" HOLLOW  
WALL IN STOCKS IN CEMENT  
TO 6" ABOVE GROUND, SLATE  
D.P.C., FACINGS P.C. 120/-M.

Structure above  
D.P.C. is not  
included in price.



## TO TYPE B, ADD FOR: (per yard run).

- 12" Extra height of brickwork above ground. . . . . 5/3.  
do. do. facings. . . . . 1/6.  
12" Extra depth of trench and brickwork. . . . . 9/10.  
3" Extra thickness of concrete and excavation. . . . . 2/4.  
Longitudinal reinforcement per 3/4" rod. . . . . 8d.

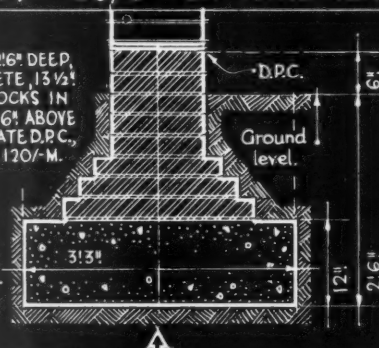
## OMIT FOR:

- Deduction of facings. . . . . 1/12.

## TYPE C: 38/8 PER YARD RUN.

EXCAVATION 2'6" DEEP,  
12" CONCRETE, 13 1/2"  
WALL IN STOCKS IN  
CEMENT TO 6" ABOVE  
GROUND, SLATE D.P.C.,  
FACINGS P.C. 120/-M.

Structure  
above D.P.C.  
is not includ-  
ed in price.



## TO TYPE C, ADD FOR: (per yard run).

- 12" Extra height of brickwork above ground. . . . . 7/1.  
do. do. facings. . . . . 1/8.  
12" Extra depth of trench and brickwork. . . . . 10/2.  
3" Extra thickness of concrete and excavation. . . . . 2/10.  
Longitudinal reinforcement per 3/4" rod. . . . . 8d.

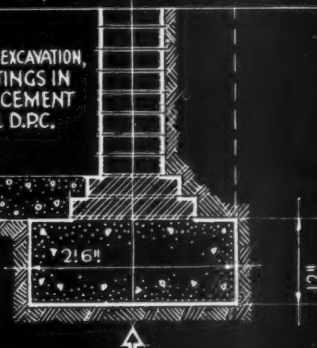
## OMIT FOR:

- Deduction of facings. . . . . 1/3.

## TYPE D: 17/- PER YARD RUN.

BASEMENT TRENCH EXCAVATION,  
12" CONCRETE, FOOTINGS IN  
STOCK BRICKS IN CEMENT  
FOR 9" WALL, SLATE D.P.C.

Basement  
floor.  
Structure above  
footings is not in-  
cluded in price.



## TO TYPE D, ADD FOR: (per yard run).

- Similar foundations to 13 1/2" wall. . . . . 9/8.  
do. do. 18" wall. . . . . 21/-  
3" Extra thickness of concrete to foundations  
of 9" wall. . . . . 2/7.  
do 13 1/2" wall. . . . . 3/2.  
do 18" wall. . . . . 3/9.  
Longitudinal reinforcement per 3/4" rod. . . . . 8d.

Future sheets of this series will analyse the cost of various types of construction & finish for external walls, partitions, doors, windows etc.

Figures by Davis & Belfield, P.P.A.S.I. Chartered Quantity Surveyors.

INFORMATION SHEET: UNIT SYSTEM FOR APPROXIMATE ESTIMATING, 5.  
SIR JOHN BURNET TAIT AND LORNE ARCHITECTS ONE MONTAGUE PLACE BEDFORD SQUARE LONDON W.C1. *Edw. A. Bizon*

THE ARCHITECTS' JOURNAL  
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## INFORMATION SHEET

• 478 •

APPROXIMATE  
ESTIMATING—VSubject : Unit System for Approximate  
Estimating

Typical examples of foundations for ordinary walls up to damp-proof course level and for basement walls up to basement floor level, are shown on the front of this sheet. Measurements should be taken on the centre lines of the walls, and adjustments in price for variations in construction, etc., made in the same manner as for the previous sheets of the series.

It will be seen that the cost of a horizontal damp-proof course has been included with all types of foundation. This has been done

for convenience, although in the case of basement walls, the damp-proof course would actually be at a higher level.

Variations in cost, for tanking the basement, etc., have been dealt with under the heading of walls, which are the subject of the next sheet (480).

An example of the method of using this sheet is given below :—

Approximate estimate for foundations of house 40 ft. by 25 ft. on plan externally with one 9 in. internal wall the full width of the building and with a basement one end, 15 ft. long internally and the full width, having 18 in. walls on all sides.

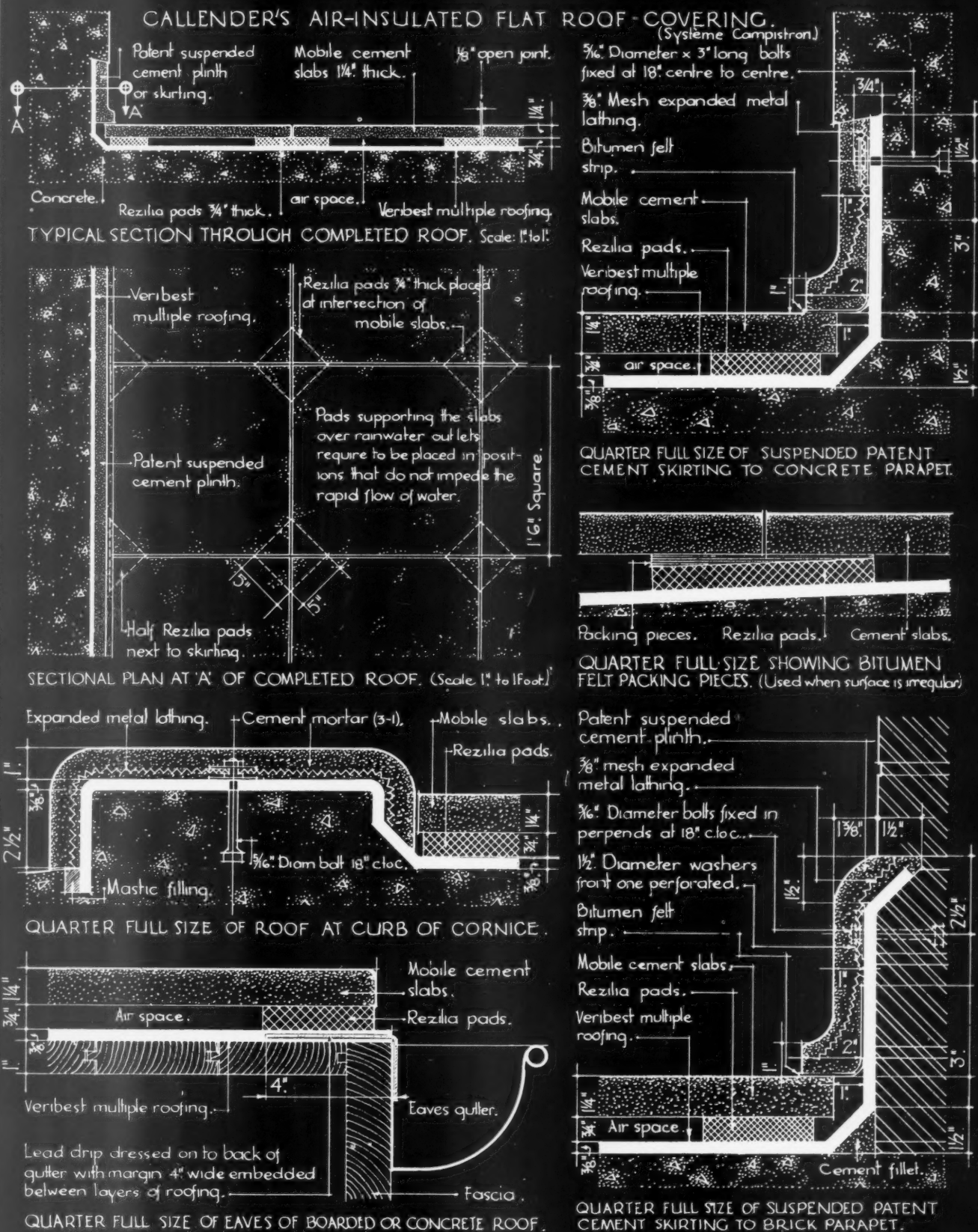
Foundations for 13½ in. external	£	s.	d.
walls (38/8) with excavation			
3 ft. 6 ins. deep (+10/2)			
22 yards run	48/10	53	14 4
Do. for 9 in. internal wall with			
excavation 2 ft. 6 ins. deep			
(27/10) and no facings (—1/3)			
8 yards run	26/7	10	12 8
Do. for 18 in. basement wall			
(38/-) with 18 ins. concrete			
under (7/6)			
27 yards run	45/6	61	8 6
Total cost	...	£125	15 6







## THE ARCHITECTS' JOURNAL LIBRARY OF PLANNED INFORMATION.



Information from George M. Callender & Co. Ltd.

INFORMATION SHEET: AIR-INSULATED FLAT ROOF COVERING.  
SIR JOHN BURNET TAIT AND LORNE ARCHITECTS ONE MONTAGUE PLACE BEDFORD SQUARE LONDON W.C.1. Oscar & Bayne



THE ARCHITECTS' JOURNAL  
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INFORMATION SHEET

• 479 •

ROOFING

**Product :** Air Insulated Flat Roof Covering  
(Système Campistron).

**General :**

Callender's patent air-insulated flat roof covering consists of mobile cement slabs laid with open joints, supported on Rezilia bituminous pads which in turn rest on the waterproofing material. The roofing may be applied to either concrete or boarded surfaces, and is suitable for flat roofs which are to be used for light traffic, roof gardens, etc.

**Description :**

(a) The waterproofing material is Veribest multiple roofing and has three layers of bitumen mastic reinforced with alternate layers of bitumen roofing felt; the whole is bound into one homogeneous mass, and forms a tough, flexible, waterproof covering approximately  $\frac{3}{8}$  in. thick.

(b) Rezilia pads are composed of a bituminous material, waterproof, durable, resilient, and sufficiently tough to withstand the weight of the slabs and traffic thereon. They are 5 ins. square by  $\frac{3}{8}$  in. thick, and are spaced approximately one pad per slab of standard size: when so spaced they are capable of withstanding a load of 56 lbs. per ft. super of roof surface without injuring the waterproofing medium. Additional pads may be employed, when necessary, for heavier loading.

(c) The covering cement slabs can vary in dimensions, weight and shape, but the standard nominal size of 18 ins. square by  $1\frac{1}{2}$  in. thick has been adopted as satisfactory for ordinary roof traffic. The slabs are of concrete reinforced with five  $\frac{3}{8}$  in. diameter steel rods—four placed around the edges and one across the centre. Where necessary, the slabs may be made by local contractors in accordance with instructions supplied by the manufacturers.

(d) Patent skirtings (as shown in detail overleaf) for use with brick or concrete parapets, chimneys, curbs, etc., are constructed by fixing to the vertical margin a reinforcement of  $\frac{3}{8}$  in. mesh expanded metal lathing by means of  $\frac{3}{8}$  in. diameter bolts at 18 ins. centres with necessary nuts and washers. A  $1\frac{1}{2}$ -in. by  $1\frac{1}{2}$ -in. chase, in the form shown, is required for the reception of the top of the skirting, or, alternatively, in the case of concrete, a recess should be formed in the parapet to house the skirting, in the manner illustrated. A band of 1-ply bitumen felt about 8 ins. to 9 ins. wide is fixed by securing one edge with bitumen to the turned-up waterproofing about 3 ins. above the level of the slab surface, allowing the other edge to rest loosely on the adjacent slab. This felt band is used merely as a form for the base of the cement mortar facing and to prevent the latter from adhering to the slabs. It is trimmed or removed when the mortar is dry. The skirting is completed with a plinth of 3-1 cement mortar 1 in. thick, trowelled into position.

**Procedure :**

The waterproofing material is laid on either concrete or boarded roofs and turned up over a  $1\frac{1}{2}$  in. by  $1\frac{1}{2}$  in. splayed angle fillet (in deal for wood roofs and in cement for concrete roofs) against parapet walls, curbs, etc., to the required height of the skirting. The Rezilia pads are placed on the waterproofing material at proper intervals so that the slabs are firmly supported at the corners, and, when placed in position, do not project beyond the diagonal lines marked on the pads. The mobile cement slabs are laid with open joints about  $\frac{1}{4}$  in. wide. Where the surface of the roof is not regular, such as at points where the direction of the fall changes, small bitumen felt packing pieces are placed on the pad beneath the corner of the slab to maintain a regular finished surface. The packing pieces should not be placed between the pads and the waterproofing material.

When the roof dimensions are not exact multiples of the slab dimensions, one or two rows of slabs less than 18 ins. square are made to special sizes to meet the requirements. The cement plinth to the skirting is formed after the slabs are laid. Pads supporting slabs over rain-water outlets should be so placed that they do not impede the rapid flow of water. Rain-water outlets through parapet walls should be lined with lead, provision being made for a returned margin 4 ins. wide to sides and bottom for embedding between the layers of waterproofing material.

**Advantages:**

(a) With open joints to let water away there is no possibility of pools of rain-water lying on the finished surface of the roof covering.

(b) The discharge of rain-water is not impeded by such obstructions as leaves and other debris lying on the roof surface.

(c) As there is no gravel or sand to collect soot and dust there can be no vegetation.

(d) The loose slab covering affords an easy and practical method of inspecting the waterproofing material.

(e) The appearance is enhanced by the fact that there are no gutters, etc., visible.

**Thermal Properties :**

The free circulation of air under the cement slabs ensures a good thermal insulation.

The bituminous composition pads act as insulators, and thus prevent heat from being conducted from the slabs to the main roof.

**Soundproofing :**

The air space between the finished surface and main roof decking has a sound-proofing effect, while the intervening pads, being bituminous, do not conduct sound to any appreciable extent.

**Weight:**

The total dead weight of this roof covering is  $16\frac{1}{2}$  lbs. per super foot.

**Prices :**

Furnished on receipt of roof plans with dimensions indicated thereon, and particulars of situation.

**Information from:** George M. Callender & Co., Ltd.

**Address (Head Office):** 25 Victoria Street,  
Westminster, London, S.W.1

**Telephone :** Victoria 5548/9





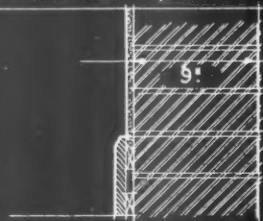
## THE ARCHITECTS' JOURNAL LIBRARY OF PLANNED INFORMATION

## APPROXIMATE ESTIMATING:

## EXTERNAL WALLS.

PRICES ARE THOSE  
CURRENT DURING  
JANUARY, 1937.

The following are approximate prices per yard superficial for external walls with finishes complete. Prices are for a medium sized job in the London area and include for overhead charges and profit. Measurements should be taken along the centre lines of walls.

TYPE A<sub>1</sub>: 19/1½ PER YARD SUPER.

9" WALL IN FLETTON BRICKS IN CEMENT, WITH RUSTIC FLETTON FACINGS PC. 75/- M. DELIVERED, LIME PLASTER, CLEARCOLLE & 2 COATS DISTEMPER, & 6" x 1" DEAL SKIRTING PAINTED.

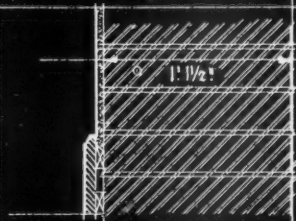


TO TYPE A<sub>1</sub> ADD FOR: per yd. super.

10/- increase in cost of facings . . . . . 10 d.  
Cement plainface & distemper externally . ½ d.  
White cement plainface externally . . 8½ d.  
Hardwall plaster and painting  
three coats internally . . . . . 1/7.  
Coved cornice to 4" radius . . . . . 9 d.  
6" x 1" Austrian oak  
skirting polished . . . . . 11 d.  
6" x 1" teak do. do. . . . . 10½ d.  
6" quarry tile skirting . . . . . 4 d.

OMIT FOR:

Fairface & distemper internally . 1/8.  
Granolithic coved skirting . . . 2 d.

TYPE B<sub>1</sub>: 24/11½ PER YARD SUPER.

13½" WALL IN FLETTON BRICKS IN CEMENT, WITH RUSTIC FLETTON FACINGS PC. 75/- M. DELIVERED, LIME PLASTER, CLEARCOLLE & 2 COATS DISTEMPER, & 6" x 1" DEAL SKIRTING PAINTED.

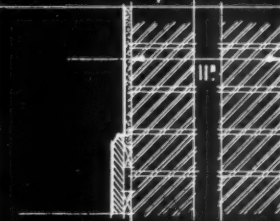


TO TYPE B<sub>1</sub> ADD FOR: per yd. super.

Each 4½" additional thickness . . . 5/10.  
10/- increase in cost of facings . . . 10 d.  
Cement plainface & distemper externally . ½ d.  
White cement plainface externally . 8½ d.  
Hardwall plaster and painting  
three coats internally . . . . . 1/7.  
Coved cornice to 4" radius . . . . . 9 d.  
6" x 1" Austrian oak skirting polished . 11 d.  
6" x 1" teak do. do. . . . . 10½ d.  
6" quarry tile skirting . . . . . 4 d.

OMIT FOR:

Fairface & distemper internally . 1/8.  
Granolithic coved skirting . . . 2 d.

TYPE C<sub>1</sub>: 20/9 PER YARD SUPER.

11" HOLLOW WALL IN FLETTON BRICKS IN CEMENT, WITH RUSTIC FLETTON FACINGS PC. 75/- M. DELIVERED, LIME PLASTER, CLEARCOLLE & 2 COATS DISTEMPER, & 6" x 1" DEAL SKIRTING PAINTED.



TO TYPE C<sub>1</sub> ADD FOR: per yd. super.

Each 4½" additional thickness  
to the inner skin . . . . . 5/10  
10/- increase in cost of facings . . . 6¼ d.  
Cement plainface & distemper externally . 8 d.  
White cement plainface externally . 1/4.  
Hardwall plaster & paint 3 coats internally . 1/7.  
Coved cornice to 4" radius . . . . . 9 d.  
6" x 1" Austrian oak skirting polished . 11 d.  
6" x 1" teak do. do. . . . . 10½ d.  
6" quarry tile skirting . . . . . 4 d.

OMIT FOR:

Fairface & distemper internally . 1/8.  
Granolithic coved skirting . . . 2 d.

TYPE A<sub>2</sub>: 21/1½ PER YARD SUPER.

Construction as in A<sub>1</sub>, but with

9" WALL IN STOCK BRICKS IN CEMENT, WITH STOCK FACINGS PC. 95/- M. DELIVERED, LIME PLASTER, CLEARCOLLE & 2 COATS DISTEMPER, & 6" x 1" DEAL SKIRTING PAINTED.



TO TYPE A<sub>2</sub> ADD FOR: per yard super.

Cement plainface and  
distemper externally . . . 1/11½.  
White cement plainface externally . 1/9½.

OMIT FOR:

Fairface & distemper internally . 1/11.  
OTHER FINISHES: add or omit as Type A<sub>1</sub>.

TYPE B<sub>2</sub>: 28/3 PER YARD SUPER.

Construction as in B<sub>1</sub>, but with

13½" WALL IN STOCK BRICKS IN CEMENT, WITH STOCK FACINGS PC. 95/- M. DELIVERED, LIME PLASTER, CLEARCOLLE & 2 COATS DISTEMPER, & 6" x 1" DEAL SKIRTING PAINTED.



TO TYPE B<sub>2</sub> ADD FOR: per yard super.

Each 4½" extra thickness . . . 7/1½.  
Cement plainface & distemper externally . 1/11½.  
White cement plainface externally . 1/9½.

OMIT FOR:

Fairface & distemper internally . 1/11.  
OTHER FINISHES: add or omit as Type B<sub>1</sub>.

TYPE C<sub>2</sub>: 23/0¾ PER YARD SUPER.

Construction as in C<sub>1</sub>, but with

11" HOLLOW WALL IN STOCK BRICKS IN CEMENT, WITH STOCK FACINGS PC. 95/- M. DELIVERED, LIME PLASTER, CLEARCOLLE & 2 COATS DISTEMPER, & 6" x 1" DEAL SKIRTING PAINTED.



TO TYPE C<sub>2</sub> ADD FOR: per yard super.

Each 4½" extra thickness to inner skin . 7/1½.  
Cement plainface & distemper externally . 1/5½.  
White cement plainface externally . 2/1¼.

OMIT FOR:

Fairface & distemper internally . 1/11.  
OTHER FINISHES: add or omit as Type C<sub>1</sub>.

Figures by Davis and Belfield, P.R.A.S.I., Chartered Quantity Surveyors.

INFORMATION SHEET: UNIT SYSTEM FOR APPROXIMATE ESTIMATING: G.  
SIR JOHN BURNET TAIT AND LORNE ARCHITECTS ONE MONTAGUE PLACE BEDFORD SQUARE LONDON WC1. Price 6s. 6d. per copy.



THE ARCHITECTS' JOURNAL LIBRARY  
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## INFORMATION SHEET

• 480 •

APPROXIMATE  
ESTIMATING—VISubject : Unit System for Approximate  
Estimating

For all normal estimates, and whenever time permits, account should be taken of the difference in cost of the various types of finish, etc., shown with each typical form of construction. These have been kept to a minimum for the sake of simplicity, but other materials, if the prices are known, may easily be compared. The estimate is only intended to show definitely that a certain building with a certain class of finish can be built for a certain sum of money, but it also shows approximately the way in which the cost is apportioned, e.g. the amount allowed for an increase in the cost of facings. Such items as doors, windows, stairs, etc., which cannot be priced per yard, will be dealt with in later sheets.

The system is not intended to replace the complicated pricing data necessary for a very close estimate, but it should, in all cases, prove more accurate than cubing, and it should be found particularly useful for alteration work, or work where the price per foot cube is not well established. An additional advantage is that firm estimates obtained for lifts, plumbing, or other services, fittings, etc., can be used in conjunction with this system much more readily than with the cubing method.

This sheet deals with typical examples of external walls in both Fletton and Stock brickwork. Measurements should be taken along the centre lines of walls and from D.P.C. level to the underside of the top floor ceiling joists or roof slab. Deductions should be made for door and window openings, and adjustments for variation in finish should be made in the same manner as for the previous sheets of the series.

It has been assumed that facings for hollow walls would be in stretcher bond, which requires fewer bricks and consequently makes the facings cheaper than for solid walls. This

again affects the cost of both types of external rendering which are priced as "extra over" the cost of facings, although the actual cost of rendering on hollow and solid walls is of course the same.

As floor heights for the majority of jobs do not vary to any very considerable extent, the amount of skirting required per area of walling remains fairly constant — approximately 1 foot run of skirting to each yard super of walls. Skirtings have, therefore, been included in with the price per yard super of walling and variations in type must be dealt with on a yard super basis. For instance, if a kitchen with one external wall 9' long and 9' from floor to ceiling has hardwall plaster and paint and quarry tile skirting, the extra cost over ordinary finishes would be worked out as follows :—

9 yards sup. at 1s. 7d. plus 4d. = 1s. 11d. per  
yard sup. = 17s. 3d.

The above remarks in connection with skirtings apply also to cornices.

An example of the method of using this Sheet is given below :—

Approximate Estimate for 13½" external walls of house 40' by 25' on plan externally, 8' 6" from floor to ceiling and 18' 6" high from D.P.C. level to underside of ceiling of upper floor.

Whole area, using Fletton bricks, £ s. d.  
rustic facings and lime plaster and distemper internally (24s. 11½d.)  
and coved cornice (+9d.)

258 yards sup. 25s. 8½d. ... 331 12 9

Extra cost of hardwall plaster and paint (1s. 7d.) and quarry tile skirtings (+4d.) and omission of cornice (−9d.) in bathrooms and kitchens.

say 30 yards sup. 1s. 2d. ... 1 15 0

Total cost ... £333 7 9

Note.—Deductions from the areas given should be made for door and window openings.

This series of sheets, taken as a whole, forms a complete system for the preparation of detailed estimates. Alternatively, less detailed estimates can rapidly be made, merely by multiplying the areas or quantities of the different component parts of the building by the appropriate unit prices, varied by judgment alone.

Sheets Nos. 1 to 5 dealt with ground floors, upper floors, roofs, parapets and eaves, and foundations respectively, and future Sheets will show the cost analysis of partitions, doors, windows, etc.





# SANITATION

## A HISTORICAL SURVEY

BY H. A. J. LAMB, A.R.I.B.A.

*Sanitation, the supply of unlimited quantities of drinkable water, and the efficient disposal of sewage is taken so much for granted that it seems hardly credible that the first true water-closet was not patented until nearly the end of the eighteenth century. Nor was Great Britain lagging behind other countries, for, in most of Europe, the bath is still looked upon as a peculiarly English fetish, and "water-closet" is one of the few internationally understood words in the English language. Yet both these adjuncts to health and efficiency existed, if only in rudimentary form, at least 3,000 years ago. In this article the author traces the development of the bath and of the w.c. from Tel-el-Amarna to the present day, through the middle ages, when the bath became a social institution, via the hip bath of the Victorians, to the built-in flush-panelled fitting now to be found in nearly all speculative builders' houses.*

### 1.—THE DEVELOPMENT OF SOIL DRAINAGE

WITH the exception of a most informative paper on the latrines and cesspools of mediæval London, and a brochure commemorating the bicentenary of a well-known firm of London sanitary engineers, very little attempt seems to have been made to set down a connected account of what, after all, is one of the most vital and important aspects of living.\*

\* *Latrines and Cesspools of Mediæval London.* By Ernest L. Sabine. Published in *Speculum*, July, 1934, by The Mediæval Academy of America.

*Under Eight Reigns, 1730-1930.* By Bertram Hellyer. Published by Dent and Hellyer, 1930.

#### THE EGYPTIANS AND THE ROMANS

Excavations on the site of Tel-el-Amarna\* show beyond doubt that, as far back as 1350 B.C., the Egyptians regarded sanitation as of supreme importance in their everyday life. They also showed that in many of its aspects, the "w.c." of these early times bears a strong resemblance to that in use today.

There was, of course, no water flushing system for the closet. It was

\* *The City of Akhenaten.* Parts I and II. Published by the Egypt Exploration Society.

usually situated near the bathroom, and had a pierced stone slab (1) for a seat. In the house of Nekt, however, there was found a variation, for here were two brick supports which may have supported a seat of wood instead of a more solid one in brick. In this manner the Egyptians created a simple form of earth closet, in which the soil fell into a movable vase beneath the seat. Another house disclosed the traces of a small chamber of which the walls had originally been covered with whitewash. On either side of the seat were two hollow spaces which, it is thought, may have contained clean sand.

Records of the domestic sanitation adopted by the Romans are extremely meagre, and it is certainly an astonishing fact that these people, whose marked progress and architectural development have been widely felt in this country and on the Continent, should not have left some remains which would shed light on this aspect of their daily life. There is, nevertheless, one link which might serve to show that they improved upon the Egyptian form of closet. A good example was discovered in North Africa where a stone channel for a constant flow of



1 : Probably the earliest type of "w.c." known : an early Egyptian limestone seat about 1350 B.C. The soil fell into a vase set in a pit below. From a house in the City of Ahkenaten, Tel-el-Amarna. (Photograph : The Egypt Exploration Society.)

water was found passing under stone seats. It may be said, therefore, that the Romans were the pioneers of the water carriage system of drainage.

Although there is much evidence of Roman occupation available in this country, there is surprisingly little evidence of their sanitary arrangements. During the later periods of the fourth century, conditions were certainly very bad, for filth and refuse seem to have been allowed to accumulate round their houses. Some of the larger dwellings, however, had their own deep refuse pits which served both for sanitation and household rubbish.

Several pits of this kind were discovered in the Roman-British houses excavated on the outskirts of Andover, the largest being 20 yards long by 5 feet across. This pit was V-shaped, from 3-4 feet deep and was entirely filled with rubbish and many tons of plaster. There was evidence that it had originally been puddled with clay and lined with rough stone slabs, and those responsible for the excavations concluded that it might have been intended for the collection of surface water, though its shape was very irregular for this purpose.\* Such brick built drains as have been found in this country, and those at Bath and Colchester are two examples, seem to have been provided for carrying off overflow water from spring or conduit fed baths, but in such cases the drains have also served for "soil" purposes and have been used to flush the public lavatories.

\* *Archæologia*, 56, Part I. Published by The Society of Antiquaries.

## MONASTERIES AND ABBEYS

Like the Romans, the monks were also town planners, but in miniature, since many of their abbeys built in accordance with the requirements of the various Orders were virtually self-contained units, and so they were obliged to pay some sort of attention to the problems of sanitation. Actually, they tackled the question with so much skill that they might be regarded as pioneers in water supply and drainage.

What sort of system they evolved may be gauged from the excellent records relating to the London Charterhouse, founded in 1371, which occupied 13½ acres of land.\* It is not recorded how the monastery was first supplied with water, though it is presumed that wells were provided in the first instance. But in 1430, the first regular supply was begun, and it is set down that John Feriby and Margery, his wife, granted to the prior and convent a fountain or spring and a portion of land, 53 perches long and 12 feet wide in Islington to make a subterranean conduit.

The monks recorded the course of the supply on a plan, much in the same way as did the Canterbury monks when the system was remodelled under Prior Wibert in the twelfth century. The original of the Charterhouse plan is on parchment, in colours, and it is pictorially illustrated with crude sketches showing the points

\* *The London Charterhouse and its Water Supply*. By W. H. St. John Hope, F.S.A. *Archæologia*, 58, Part I.

of intersection of the services. In the centre of the cloister, with the cells surrounding it, there is shown an octagonal structure, something like a covered font. This is called the "Conduit House"; the upper half contained a lead cistern into which the main supply flowed, and from it sprang the various branches.

From the spring, the water came by stone gutter and lead pipe which gradually increased in bore until the middle of the Great Cloister was reached. On the way the pipes passed through square receptacles, termed "suspirals." These are taken to be vents or breathing holes to let air out and prevent the possibility of the pipes being burst by internal air pressure.

Such a description is borne out by an account published in 1662, from which the following passages are taken\* :—

Within the Cloister-garth, over the Frater-House-door, was a fair Laver, or conduit, for the Monks to wash their hands and faces, being round, cover'd with Lead, and all of Marble, saving the outermost walls, within which they might walk round about the Laver. It had many Spouts of Brass, with twenty-four Brass Cocks, round about it, having in it seven fair windows, of stone work, and over it a Dove-cote cover'd with Lead, finely wrought ; as appears to this day.

Adjoining to the East-side of the Conduit-door hung a Bell to call the Monks, at eleven of the Clock, to come and wash, before dinner, having their Closets or Ambries on either side of the Frater-House door, on the outside within the Cloister, kept alwayes with clean Towels to dry their hands.

There was also a large, and decent place, adjoining to the West-side of the said Dorter, towards the water, for the Monks, and the Novices to resort to, called the Privies, two great Pillars of Stone bearing up the whole floor thereof. Every Seat, and Partition was of Wainscott, close on either side, so that they could not see one another when they were in that place. There were as many seats on either side as there were little Windows in the Wall to give light to the said Seats ; which afterwards were walled up to make the House more close. At the West-end of it there were three fair glass Windows ; which great Windows gave light to the whole House.

Around most abbeys were the living quarters of the monks, and the sanitary wing, known as the rere-dorter, or necessarium, was often attached to the dorter, or dormitories, by a bridge. These wings were sometimes of considerable length—that at Lewes was 158 ft. long and at Canterbury its length was 145 ft. The monastery of Christchurch, Canterbury, obtained access to the source of its water supply in 1150, and a complete system of water service was conveyed through lead pipes which passed under the city walls and fed the cisterns, kitchens, bath-houses, lavatories and fishponds until, passing through five filter beds before combining with the city's sewage, it flowed into the town ditch.

At Furness, the seats of the necessarium were ranged back to back in one long

\* *The Ancient Rites and Monuments of the Monastical and Cathedral Church of Durham*. Compiled by J. Davies, of Kidwelly. Published 1662.

double row, but in other cases the rows of seats were usually set against a wall, each with its own window, and divided by a partition. Below was a walled-in drain which was either artificially cut or was a natural stream diverted, and it might be remarked that many so-called underground passages are in reality the remains of great drains.

Recent excavations at St. Albans shed further light on the sanitary arrangements of the Benedictine monks. These were discovered in April, 1924, on the site of the Great Cloister.\* Here was found a deep pit, 18 ft. 8 ins. long by 5 ft. 3 ins. wide; the walls were 15 ins. thick. The depth of the pit below the Cloister floor level was 25 ft. At the bottom were found pieces of pottery and fragments of coarse cloth which, it is thought, were old gowns torn up by the monks and used as toilet paper. Evidence, too, that the monks suffered from digestive troubles, which were by no means rare in those days, was proved by the finding in the pit, seeds of the buckthorn—a powerful aperient. Above this pit were four arches, two of which were intact, and west of the Cloister walk an old mediæval drain was unearthed.

## MEDIÆVAL CASTLES

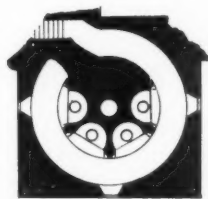
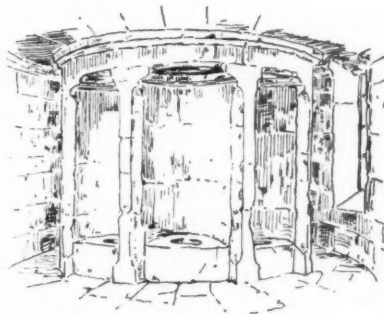
Following on from the arrangements of the monks to provide some form of domestic sanitation, the sequence in development might be continued by considering the form of the latrines, or garderobes, in some of the mediæval castles.

In some cases the provision of these seems to have been almost overdone, for some nobles had garderobes for every important room, in addition to those on each story of their castles.

At Langley Castle, Northumberland, the principal tower was given over to these apartments (3), and four were provided for each floor. Each had a separate flue which emptied into a stream at the bottom. At Ludlow Castle, the sanitary tower was fitted with stone seats and had oblong shafts leading to the moat. Sometimes turrets, instead of towers, were built. These were reached by passages in the thickness of the wall and so formed corbelled-out privies to give clearance for the soil. They were lighted by small loop-holes.

Wherever there was a stream running through the moat it was customary to divert a portion of it and make it flow through the garderobe pit, and Henry III seems to have been one of the first kings of England to have given special instructions in such matters. In 1237, he issued a royal writ instructing the Sheriff of Surrey to cause a privy chamber to be made adjoining the King's Great Chamber, on the ground

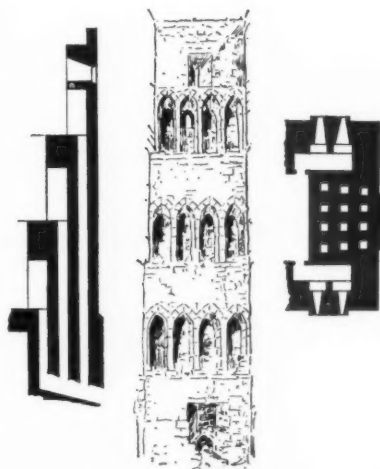
\*Transactions, 1926, St. Albans and Hertfordshire Architectural and Archaeological Society.



2 : Elevation and plan of the Garderobes in the thickness of the wall at Southwell Palace.

floor, at Geldeford (Guildford), where it would be over a ditch somewhat similar to that at the Palace of Westminster, built upon arches over the Thames. But the clerk of works was ordered to block up the entrance with strong bars so that no one could pass through.

Again, at the Tower of London, the Constable was ordered to "cause the drain of our private chamber to be made in the fashion of a hollow column." There were, of course, other garderobes in different parts of the Tower, placed without much regard for their suitability from an aesthetic point of view. There was one, for example, at the north end of the banqueting hall (4), so that on festive occasions the nearest guest was only a few feet from its entrance. It was a small vaulted chamber, 3 feet wide and about 7 feet high, built within the thickness of

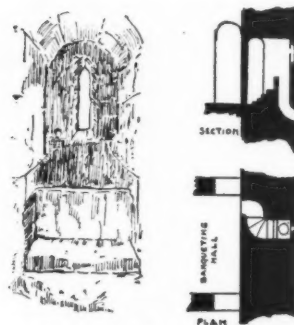


3 : Garderobes at Langley Castle.

the wall. There was a narrow window for light and ventilation, and in front was a 19-inch stone riser, the full width of the chamber. The "seat" consisted of a space about 25 inches in depth, and below there was a hole in the wall so that soil was discharged down its face into the moat below.

That such privies should be constructed with an eye to comfort is illustrated by the King's order to the Sheriff of Southampton, a year later. He was instructed to make in Winchester Castle, a fireplace and a privy within a certain chamber. Thus, garderobes were often built in the thickness of chimney breasts in order that they should be warm and comfortable in cold weather.

A certain amount of comfort and orderliness resulted from the interest



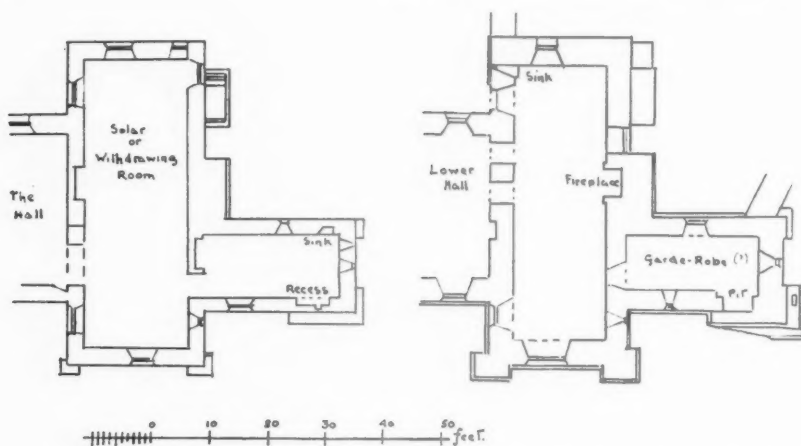
4 : Garderobe in the Tower of London: about 3 ft. wide by 7 ft. high. The 19-in. stone riser is the full width of the chamber, leaving a space of about 25 ins. behind for a seat. It discharged down the face of the wall into the moat.

in sanitation taken by Henry III., but for king and people alike, where there was no running stream for the clearance of privy filth, great wells or cesspits had to be dug, similar to that at Everswell. This was ordered in 1239 to serve the king's wardrobe, and that below, which was probably the queen's.

What the cleaning out of these pits entailed is best illustrated by the evidence that it took 13 men five nights to clear the cloaca, or privy, of Newgate Jail in 1281. The total expense for this work, which was considered large at the time, was £4 7s. 8d. It was made up by the wages of the cleaners, who earned 7d. each per night, the four watchmen who stood at the gap in the wall to guard the prisoners from escaping, and the cost of the material which included cleys (hurdles), boards, ladders, lights, timber and nails for making two doors, and for the repair of the seat and the breach in the stonework.

A similar problem confronted the authorities some years later, brought





5: Aydon Castle, Northumberland. Basement or ground floor (right); and upper floor (left).

to a head by the general complaint which arose over the state of the Fleet Prison ditch. In 1355, Edward III. ordered an enquiry into its condition, and it was found that in spite of its being 10 feet wide, and deep enough to float a boat, it was so choked with filth as to be a public menace.

### PUBLIC LATRINES

At this period in history the private latrine was rare, for the householder and the public were expected to make use of such public conveniences as existed. The risk of doing so gives a sidelight on the times, for a certain John de Abydon was attacked by rogues and killed, in 1291, as he was coming out of a common privy situated in London Wall within Cripplegate Ward, at the head of Philips Lane. With such risks to be faced one can, perhaps, sympathize with the ingenious woman who constructed her own privy and connected the outflow by a wooden pipe to the rainwater gutter. Unfortunately, the complaints of the neighbours, when the pipe became blocked, brought a heavy summons on the unlucky woman's head.

As far as London was concerned, the provision of public latrines was quite inadequate, and an historian mentions only three of any importance. One at Temple Bridge, or Pier, south of Fleet Street, built over the Thames. It was well covered, and had four apertures. Another at Queenshithe, in the form of an open sewer with a stream of water. The third was at London Bridge, and actually seems to have been the largest. This is not surprising, since it not only had to serve those who passed by, but many tenants of houses in the neighbourhood and the shops on the bridge which, in 1358, numbered 138.

Perhaps the Black Death, which ravaged Europe ten years earlier, and reached a climax in England in 1349, when it carried off a third of the

population, was responsible for such attempts to cope with a difficult problem. But even with these "luxuries," the sanitation of London was deplorable, and the lowered standard of health brought about by such conditions must have contributed largely to the high percentage of deaths.

### PRIVATE LATRINES

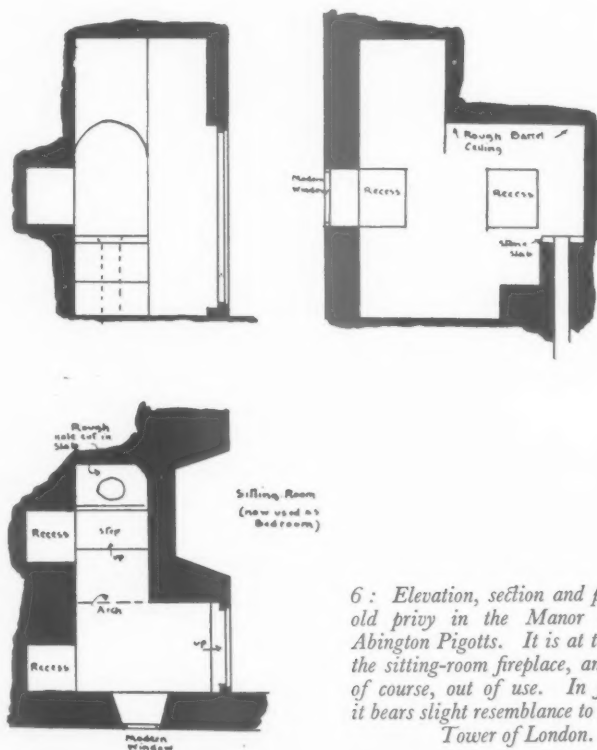
The inconvenience of the public latrine was sufficient to encourage householders to construct their own privies, and the efficiency of these depended more on financial status than

technical knowledge, for the importance of ventilation in connection with sewage disposal was scarcely understood.

Wealthier classes, however, attempted to minimize smell from their privies by having the soil chamber connected by a pipe, but the poorer people dug deep pits which were covered by boards. As these were sometimes 20 feet deep, and the boards were liable to rot, there were many accidents by persons falling through and being literally drowned in their own filth.

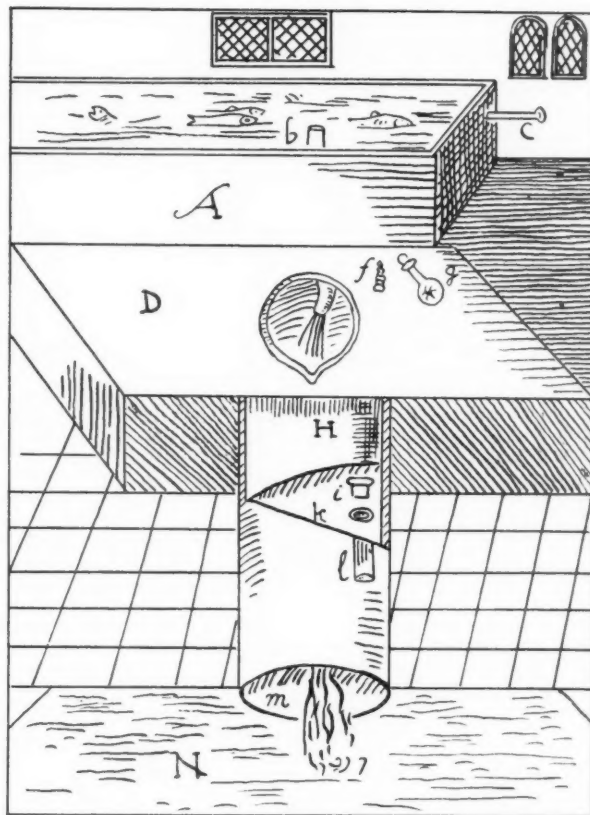
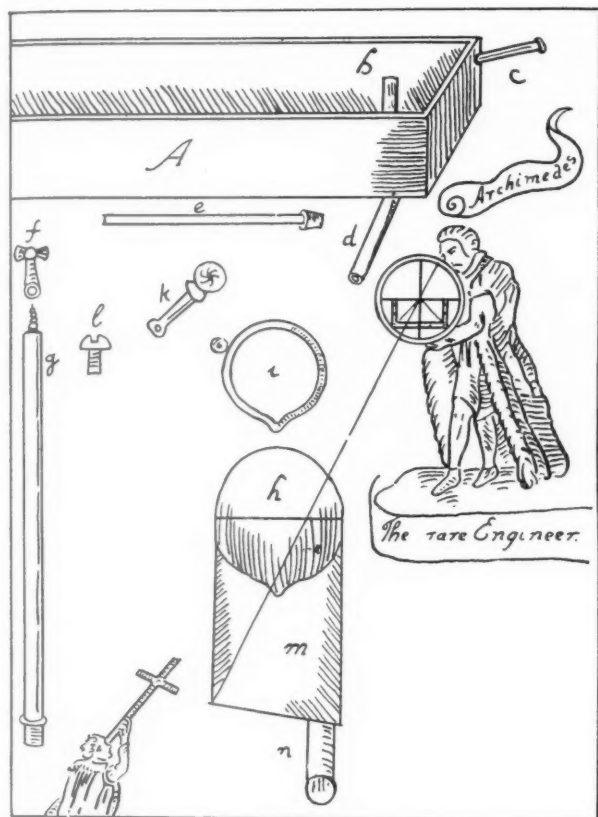
Encouragement was nevertheless given to those wishing to build their own latrines, which were authorized by the City authorities of London in 1383, provided they abutted watercourses. Each owner was then expected to pay 2s. per year to help keep them clean; this led to a good deal of abuse and resulted, eventually, in the banning of all private latrines over the Fleet River.

In 1402, one practical minded landowner constructed a tower for the benefit of his tenants, on a site now occupied by the Fishmongers' Hall. It contained a latrine 5 ft. 1 in. long by 1 ft. 5 ins. in depth, and had the advantage of the Thames for soil clearance. Not all landowners were so healthy-minded, for a wardmote inquest for the Basinghall Ward, a few years later, reported that all little rents of the "Swan" were without privies, and that tenants were throwing filth and liquid out of their doors, to the intense annoyance of churchgoers and pedestrians. Enquiry, too, revealed that in 1579, nearly 60 house-



6: Elevation, section and plan of an old privy in the Manor House of Abington Pigotts. It is at the back of the sitting-room fireplace, and is now, of course, out of use. In formation, it bears slight resemblance to that at the Tower of London.





7: Sir John Harington's water-closet (1596). "Plan plots of a privy in perfection. Left: this is Don Ajax house of the new fashion, all in sunder, that a workman may see what he hath to do. Right: Here is the same all put together that the workman may see if it be well."

holders in Tower Street, in the parish of All Hallows, had only three privies for 85 people.

The ingenuity with which the private owner constructed his privy has resulted in much conjecture today, for it now seems more romantic to suggest that certain apartments were "oratories" or "hiding-holes" for refugees, when they were in all probability nothing but w.c.'s.

At Aydon Castle, Northumberland, a good example of a thirteenth century manor house, it was thought that a room off the solar, or withdrawing room, on the first floor, may have been used as a chapel at some time, since the terms "aumbry" and "piscina" are used for certain recesses (5). Some years ago, however, a member of the Society of Antiquaries pointed out that this was inconsistent with the large hollow buttress at an angle where there was an external chute or drain. Reference to the ground floor suggested that this was a garderobe shaft, so that the "piscina" would become a sink, and the "aumbry" a wall closet.

A similar doubt seems to exist at the manor house of Abington Pigotts, near Royston. According to a little handbook we learn that a licence for a portable altar was granted to the owner for himself and his wife in 1426, and it is stated that the two little rooms on the east side of the building, near the

ancient chimney, were oratories. The small L-shaped chamber, with its barrel ceiling and rough walling may, of course, have been a tiny chapel, with the step a kneeling slab. But if this were the case, it has at some later date been desecrated, for it would seem that the altar slab has been reversed, judging from the nosing, when it was pierced with a hole to form a seat over a shaft which has long ago been partially filled in (6).

### INVENTION OF THE WATER CLOSET

About 1449, a citizen of London constructed a chimney for his kitchen, together with a stone privy and a lead cistern and pipe. Although it is thought that this cistern was intended for rainwater, and the pipe a vent or overflow, such an arrangement may well have been the forerunner of the water closet, for a century and a half later a similar idea was found in the first crude valve water-closet invented by Sir John Harington, in 1596.

This, it is recorded, was a bowl-like receptacle, with water supplied from a cistern to give a depth of 2 feet in the bowl; when water was plentiful, this container was frequently emptied, but if not, the bowl was only flushed once a day.

To appreciate the ingenuity of Sir John Harington's invention (and he had faith enough in its properties to have one installed at Kelston, near Bath), it is necessary to study some extracts from a most extraordinary and entertaining description which he produced, with the help of a friend, under the title of *The Metamorphosis of Ajax*. Here he sets out in great detail the construction of this important advance in sanitary comfort (8).

Sir John Harington's invention did not have immediate revolutionary results, for by this time the mediæval privy had been superseded by the simpler slop pail which did not produce such unpleasant results in the country as it did in the town, where it was the habit to empty the contents into the street. Well into the seventeenth century this habit seems to have been prevalent, Pepys recording how he was driven indoors in London, one fine summer evening.

As we now approach a period when a new nobility was responsible for great activity in building, it is curious that the architects of the day did not grasp the significance of the water-closet. There is evidence, however, that Queen Anne appreciated its advantages, for at Windsor there was installed an up-to-date arrangement described as "a little place with a seat of Easement of marble with sluices of water to wash all

## TO M. E. S., ESQUIRE

SIR,

My master having expressly commanded me to finish a strange discourse that he had written to you, called the Metamorphosis of Ajax, by setting certain pictures thereto. . . . Wherefore now, seriously and in good sadness, to instruct you and all gentlemen of worship, how to reform all unsavoury places of your houses, whether they be caused by privies or sinks, or such like (for the annoyance coming all of like causes, the remedies need not be much unlike) this shall you do.

## AN ANATOMY

"In the privy that annoys you, first cause a cistern, containing a barrel, or upward, to be placed either in the room or above it, from whence the water may, by a small pipe of lead of an inch be conveyed under the seat in the hinder part thereof (but quite out of sight); to which pipe you must have a cock or a washer, to yield water with some pretty strength when you would let it in.

"Next make a vessel of an oval form, as broad at the bottom as at the top; two feet deep, one foot broad, sixteen inches long; place this very close to your seat, like the pot of a close-stool; let the oval incline to the right hand.

"This vessel may be brick, stone or lead; but whatsoever it is, it should have a current of three inches to the back part of it (where a sluice of brass must stand); the bottom and sides all smooth, and dressed with pitch, rosin and wax; which will keep it from tainting with the urine.

"In the lowest part of the vessel which will be on the right hand, you must fasten the sluice or washer of brass, with solder or cement; the concavity, or hollow thereof, must be two inches and a half.

"To the washers stopple must be a stem of iron as big as a curtain rod; strong and even, and perpendicular, with a strong screw at the top of it; to which you must have a hollow key with a worm fit to that screw.

"This screw must, when the sluice is down, appear through the plank not above a straw's breadth on the right hand; and being duly placed, it will stand about three or four inches wide of the midst of the back of your seat.

"Item, That children and busy folk disorder it not, or open the sluice with putting in their hands without a key, you should have a little button or scallop shell, to bind it down with a vice pin, so as without the key it will not be opened.

"These things thus placed, all about your vessel and elsewhere, must be passing close plastered with good lime and hair, that no air

If that which follows offend the reader, he may turn over a leaf or two, or but smell to his sweet gloves, and then the savour will never offend him.

The cistern in the first plot is figured at the letter A; and so likewise in the second plot. The small pipe in the first plot at D, in the second E; but it ought to lie out of sight.

The vessel is expressed in the first plot H.M.N., in the second H.K.

The current is expressed in the second plot K.

A special note.

In the second plot I.L.

In the first plot G.F., in the second F. and I.

In the first plot between G.I.

This shows in the first plot K.L., in the second G.; such are in the backside of watches.

Else all is in vain.

come up from the vault, but only at your sluice, which stands closed stopped; and it must be left, after it is voided, half a foot deep in clean water.

"If water be plenty, the oftener it is used and opened, the sweeter; but if it be scant, once a day is enough, for a need, though twenty persons should use it.

"If the water will not run to your cistern, you may with a force of twenty shillings, and a pipe of eighteen pence the yard, force it from the lowest part of your house to the highest.

"But now on the other side behold the Anatomy."

Here are the parts fet down, with a rate of the prices; that a builder may guefs what he hath to pay.

	s.	d.
A, The Cistern : stone or brick. Price	6	8
b, d, e, the pipe that comes from the cistern with a stopple to the waffer . . . . .	3	6
c, a waffe pipe . . . . .	1	0
f, g, the stem of the great stopple with a key to it . . . . .	1	6
h, the form of the upper brim of the vefel or stool pot . . . . .		
m, the stool pot of stone . . . . .	8	0
n, the great brafs fluice, to which if three inches current to fend it down a gallop into the JAX . . . . .	10	0

(Memorandum.—The scale of the drawings is about half an inch to one foot.)

A	the cistern
b	the little washer
c	the waste pipe
D	the seat board
e	the pipe that comes from the cistern
f	the screw
g	the scallop shell to cover it when it is shut down
H	the stool pot
i	the stopple
k	the current
l	the sluice

m, N the vault into which it falls; always remember that ( ) at noon and at night empty it, and leave it half a foot deep in fair water. And this being well done, and orderly kept, your worst privy may be as sweet as your best chamber.

But to conclude all this in a few words it is but a standing close-stool easily emptied. And by the like reason (other forms and proportions observed) all other places of your house may be kept sweet.

Your worships to command,

T.C.,  
Traveller.

These forces, as also the great washer you shall buy at the queen's braziers in Lothbury, at the bear's head.

8 : Extracts from a description, by Sir John Harington, of his valve water closet (see page 389).

down." One astute country gentleman, not to be outdone, constructed a closet "big Enough for a little bed," to quote the words of Mrs. Celia Fiennes, who recorded the manners and customs of the time in her "Rides through England on a Side Saddle."

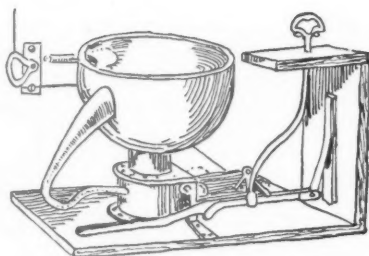
William Kent, in his designs for Holkham, Norfolk, for the Earl of Leicester in 1734, evidently remembered the need, but included company as well, for he planned a closet in an odd corner of the hall with seating accommodation for two. He forgot, however, the desirability of ventilation and omitted a window. James Paine, in his plan for Kedleston, 25 years later, repaired this omission, though his one

closet in the building was single. In some cases, the closet became relegated to the garden, as in Carlyle's Chelsea house, and in the country it developed into a kind of garden temple, as at Porthenhall Rectory, near Kimbolton.

Since the question of household sanitation is so closely connected with water supply, one may here include a few details of the first attempts to supply Londoners with water. Such information can be culled from the survey of John Stow, that most accurate and businesslike historian, and was incorporated in a paper published some years ago.\*

\* *Ancient Conduit Head in Queen Street, Bloomsbury. Archaeologia*, 56, Part II.

Here it states that there seems to have been no attempt at a regular house to house supply of water in the sixteenth century until Peter "Morris," called by Stow a German and by others Dutch, established a pumping station at the first arch of London Bridge, on the north side. He conveyed water, says the antiquary, Abraham Fleming, "in pipes over the steeple of St. Magnus' Church, and so into diverse mens houses in Thames Street, New Fish Street and Grasse Street, up into the north-west corner of Leadenhall—the highest ground of the Citie—where the waste of the first main pipe ran first this year, 1582, on Christmas Eve. This main being brought up at the Citie

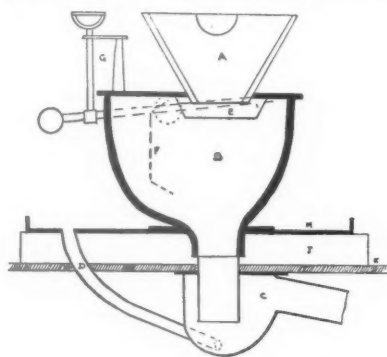


9 : *Bramah's valve closet.* Joseph Bramah invented this valve closet in 1790, though the first of this type was patented by Alexander Cummings in 1775. Bramah's closet was the forerunner of the "Optimus" valve w.c. patented in 1875 by Stevens Hellyer.

'change into a standard, and divided into several spouts, ran four waies, plentifully serving the use of the inhabitants that will fetch the same into their houses. A great commodity to the Citie."

## THE EVOLUTION OF THE WATER CLOSET

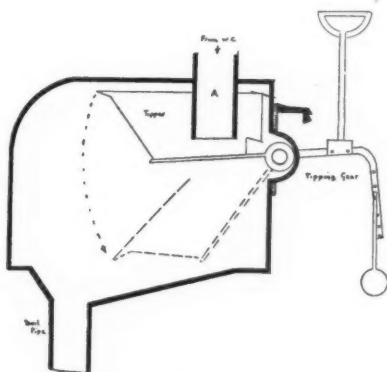
The first valve w.c. to be patented was that of Alexander Cummings in 1775. Three years later it was followed by that of Joseph Bramah, which aimed



10 : *An early type of pan closet* (Specimen in the Parkes Museum of the Royal Sanitary Institute). A : Stoneware basin ; B : metal container ; C : lead "D" trap ; D : overflow ; E : pan ; F : position of pan when open ; G : opening and flushing gear ; H : lead tray ; J : wooden support for closet ; K : floor boards. This type of closet was very objectionable, for container "B" soon became fouled. If water in pan "E" was displaced or evaporated, this foul container was directly open to the room. "D" trap at "C" also got encrusted with soil and overflow from lead tray could easily be blocked. This closet was flushed from a lead-lined cistern which also supplied a draw-off tap for domestic purposes. Supply pipe from cistern to closet was connected with a service box in cistern to which was attached  $\frac{1}{2}$ -in. escape pipe for air. Spindle valve on service box was connected by wires and cranks with pull-up apparatus of closet. The standing waste (or overflow pipe) of cistern is connected with "D" trap "C" under closet, as also was waste pipe from lead tray under closet container.

at a simultaneous emptying and flushing of the pan (9).

An example of the pan closet of an early date can be seen at the Parkes Museum of the Royal Sanitary Institute, and this, with many others is available for examination (10 & 11). This closet was extremely objectionable, for the interior soon became fouled, and if water in the pan were displaced, or became evaporated, the container was directly open to the room in which the closet was situated. Moreover, the "D"



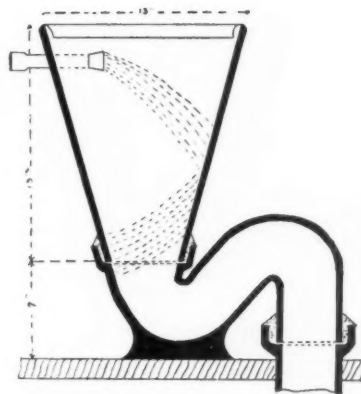
11 : *Banner's patent drain trap* (Specimen in the Parkes Museum of the Royal Sanitary Institute). This obsolete specimen of trap was removed during re-drainage work in the Borough of Greenwich. The cast-iron container was provided with a glass front. The w.c. discharged into the 4-in. lead pipe "A," off which were two  $1\frac{1}{2}$ -in. vent pipes. The soil dropped into tipper, and on raising the gear it was discharged into soil pipe. Apparently the tipper and pipe "A" were expected to form a sufficient seal.

trap underneath was usually encrusted with soil and the overflow leading to it from the lead tray was very easily blocked.

There were naturally other variations of this pattern, and one, known as the "Long Hopper" was also objectionable (12). The idea in this pattern was to release a stream of water so that it flowed in spiral fashion down the pan. As this was long and tapering, the sides soon became fouled and the flush only cleaned it in parts. Another was the plunger or plug closet, also highly objectionable. The specimen illustrated was removed from a house in Marylebone and presented to the Parkes Museum in 1930 (13).

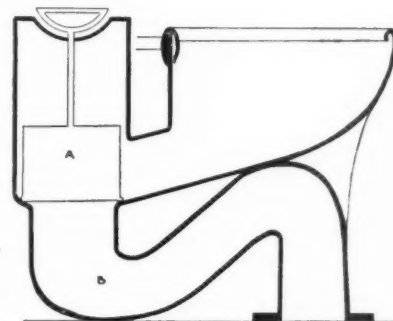
The pan type of closet came into use in 1790, and Stevens Hellyer was one of the first to condemn it in favour of Bramah's pattern, on which he improved. In due course he patented his "Optimus" valve w.c., which, incidentally, was supplied to Buckingham Palace and other royal residences and to most of the leading mansions throughout the country.

Although many forms of water closet have been evolved, they can be classed under several heads. There is the pan type, just mentioned, in which water



12 : *The long hopper w.c.* (Parkes Museum of Royal Sanitary Institute). This closet was connected to the same type of cistern as the pan closet. The flush was in the form of a spiral down the basin, and owing to the long tapering sides it only cleaned a part of it, and so was easily fouled.

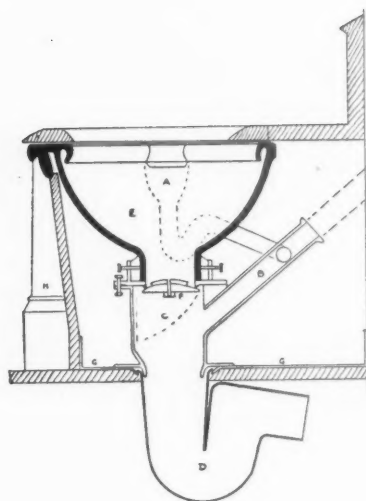
is kept in the pan and discharged into a container, and thence into a D-trap. It is obsolete today. Next comes the valve type in which a valve or flap is actuated by a handle so that the soil descends directly into a syphon trap (14). This variety, it might be remarked, is one of the most silent invented, although since the flap is capable of retaining



13 : *Plunger or plug closet* (Specimen in the Parkes Museum of the Royal Sanitary Institute). Another objectionable type of closet. Here, the rubber-seated plug "A" retained water and waste matter prior to discharge in trap "B". Filth which adhered to it required manual cleaning, owing to imperfect seating and perishing of washer, which allowed the pan to empty prematurely.

water and waste matter before discharge, it is liable to become fouled and so lose its watertightness. Thirdly, there is the wash-out w.c., specimens of which can still be found in use (15). The main objection is that the force of the flush is broken on reaching the basin, and this leads to the fouling of the connection between it and the trap. This has now been superseded by the wash-down closet of which there are many variations (16).





14 (left): *The Valve Closet.* This specimen was presented to the Parkes Museum of the Royal Sanitary Institute by Messrs. Dent and Hellyer. A: Overflow from basin; B: vent pipe for chamber; C: metal chamber; D: lead anti-D trap; E: earthenware basin; F: valve opened by hand; G: lead tray; H: Wooden enclosure.

15 (above): This type of w.c. is still in use nowadays.

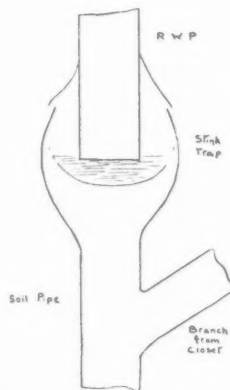
## VENTILATION OF W.C.'S.

From what has previously been written it is opportune, perhaps, to touch at this stage upon the question of ventilation, which seems to have been a difficult matter to solve (17).

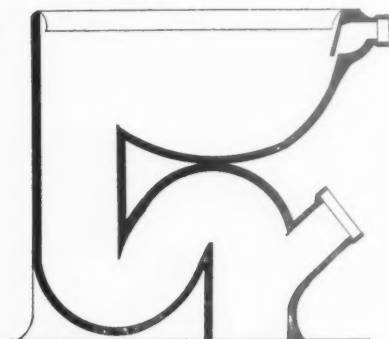
Nevertheless, an attempt to elucidate such matters was made by a Mr. John Phair in 1814. He discussed the matter in a little book\* in which he includes, curiously enough, some observations on chimneys and bell-hanging. There is however, some excuse for the latter subject, for in dealing with bells he naively remarks—"how earnestly does the bell-hanger look after the perpendicular track of the soil pipe of a water closet to convey his wires to the

underpart of the house. But how agreeably surprised he would be to find a tube made on purpose."

Domestic life in the early days of the nineteenth century must have been



17: *Slink trap.* This obsolete trap enabled a vertical rainwater pipe to join a soil pipe. The trap is in form of a cup and was placed in the pipe just above the junction of the soil branch. The seal was, of course, inadequate and permitted sewer gas from soil pipe to escape into that part of the pipe used for rainwater. This actual specimen is in the Parkes Museum of the Royal Sanitary Institute.



16: *The wash-down closet.* An ordinary type of water closet which has many variations, but all conform in detail. The outlet from trap is an "S." Alternative forms are "P," "Q," or Half "S." The usual height of this closet from floor to top of flushing rim is 16 ins., and overall depth from front of flushing rim to extreme edge of outlet is about 25 ins. Water enters flushing rim through 1½ ins. pipe with rubber core connection at back of seat. There is a 2½ ins. water seal leading to a 3½ ins. outlet.

\* *Observations on the Principle and Construction of Water Closets, Chimneys and Bell-Hanging.* By John Phair, Surveyor of Buildings. Published 1814.

extremely unpleasant. Mr. Phair says that water closets were then in general use and were fitted up at great expense in the neatest manner with excellent workmanship. Much ingenuity was displayed in the conveyance of the water into the soil pipe, for, to all appearances, the water valves were supposed to remain free of any nauseous smell.

He speaks of families he knew who had to tolerate the same effluvia as if an open churchyard was contained within the walls of their houses. To mitigate this he mentions how workmen would come and pull up the fine linings,

"slap" the walls, cut the floors, alter the cisterns and make new soil pipes. He wonders how any gentleman could imagine that air enclosed in a pipe, shut up at both ends, with no means of escape, should not be forced through the water valve into the closet, "of course by mistake," and so discharge the whole of the stagnated air lodged in the pipe into the closet, every time it is used, with a "guling" noise.

The risks to which unfortunate plumbers were subject is shown by a description of one house, where the under-end of the soil pipe was immersed in a pit sunk in an area, over which was a privy for the women servants. "Two workmen had a narrow escape for their lives, for, upon opening the flags, one of them, bowing down to examine the shaft, was suddenly surrounded by flame from a lighted candle in his hand. There was an explosion which split a water bucket, stunned the men, and shut the door, which was half open, with a great noise."

An interesting comparison with this state of affairs can be made by studying the recommendations and notes made by Mr. Phair on the construction of the soil pipe, and those of today as incorporated in the one-pipe system, which has been hailed as the most important development in the history of sanitation.

### Faulty Construction of the Soil Pipe Explained.

Fig. 18—i

Definition I.—That air remaining in the soil pipe, betwixt D and B confined between the two water valves, K and H, if long kept, will of itself stagnate.

Definition II.—That every time the water valves are set a-going, the air lodged betwixt them is discharged into the closet, and is again replaced with still more corruptive air from the drain W, there being no other communication.

Definition III.—According to the quantity of water let into the soil pipe at the seats V (there not being a perpetual run, and from a smaller pipe), the same quantity of foul air, bulk for bulk, is emitted into the closet.

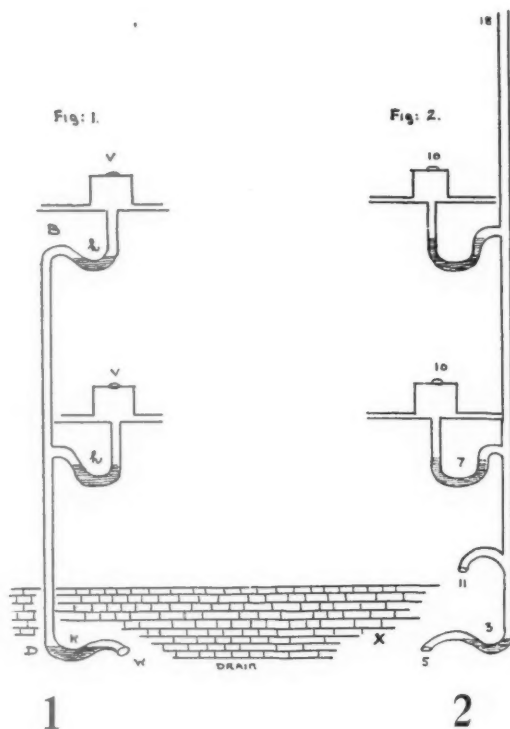
Definition IV.—That independent of soil being poured into the pipe, it otherwise is a complete natural pump for fetching the corruptive air lodged in the drain W up to the closet, every time the water valves are set a-going.

### Improved Construction of the Soil Pipe Explained.

Fig. 18—ii

Definition I.—That there is a continual succession at all times of wholesome air, kept up in the soil pipe, by means of the opening 11 and 18, whereby the pipe is always charged and no interim vacuum





18: Diagrams from John Phair's "Observations on the Principle and Construction of Water Closets," published in 1814. The construction is explained in the article.

occasioned by the going of the valves, so that the pressure of the atmosphere at 5 in the drain X never can force the water valve 3 which entirely excludes the foul air lodged in the drain from entering the soil pipe at 5.

**Definition II.**—Instead of the foul air entering the closet from the soil pipe, when the valves are set a-going, the air in the closet will have an inclination to enter the soil pipe, along with the rush of the water which is let off with the soil, by means that the opening 18 is higher than the opening at the seat 10.

**Definition III.**—According to the said principle, the stream of air which is always maintained through the soil pipe (by means of the opening 14 and 18) can never enter the closet through the water valve 7, so that the air in the body of the drain and in the chamber of the pipe is effectively prevented from entering the closet.

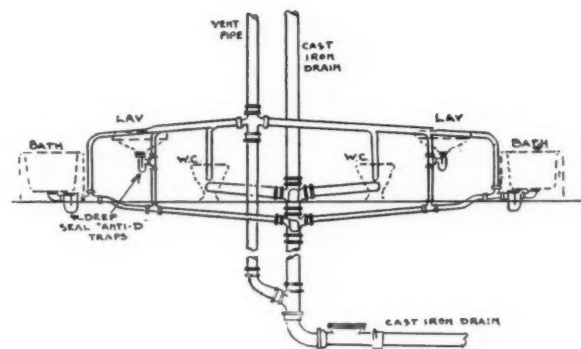
The pioneers of the one-pipe system, in this country, were, I think, Dent and Hellyer, who applied it to the Cumberland Hotel, which contains 1,000 private bathrooms, and the public and staff sanitary accommodation had also to be adequately linked up (19).

Among the advantages of this system is cost. For, although the main and ventilating stacks in a one-pipe system must be larger in proportion and perfectly balanced, much economy can be effected and maintenance expenditure reduced. A single soil pipe, too, is more adequately flushed, for every drop of waste water helps to keep the pipes clean, and so the chances of stoppage and corrosion are reduced to a minimum. From the architect's point of view, there is the question of appearance. Fewer pipes mean a reduction in number of these unsightly features down the exterior of a building. The neat appearance of the 'one-pipe over the dual pipe system is clearly explained by the two line drawings (19).

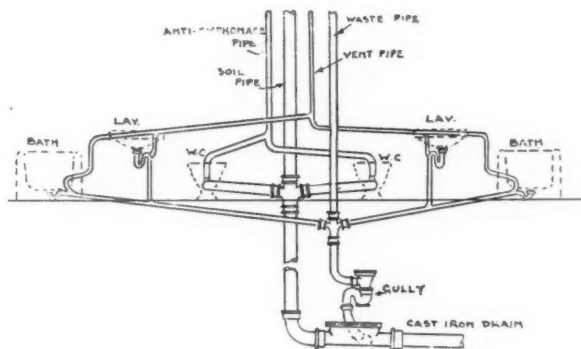
## THE SYPHONIC WATER CLOSET

One of the earliest types of syphonic water closet was that patented by John Randall Mann, of East Cowes, in 1870. It says much for the efficiency of his invention when it is stated that a specimen in excellent working order was removed from Little Cloisters, Westminster, in March, 1903, where it had been in constant use since 1872 (20).

Mann's closet was intended to ensure



19: The one-pipe system of drainage compared with the ordinary dual pipe. The one-pipe system applied to the same group of appliances as that shown below. Note the simplification of the entire scheme, due to elimination of the separate waste stack and its attending ventilating pipes. Below: the ordinary pipe lay-out for a group of sanitary appliances drained by the usual dual pipe system. (Drawings prepared by Dent and Hellyer.)



complete removal of contents and to prevent gases rising from the soil pipe by the use of a syphon. The lower part of the basin was connected to a bend or elbow pipe, the long leg of which discharged through a "D" trap into the drain. Before the handle was pulled, the basin contained about a third of a gallon of water, but on pulling, half a gallon was quickly discharged and was followed by a slower supply.

The first quantity of water produced a syphonic action which carried the contents away by driving forward the air in the bend of the short leg. In passing through and out of the bottom of the longer leg, the water was checked, but syphonic action continued and forced the contents into the soil pipe without allowing foul air to escape backwards. There were three delivery pipes for the water; one for the spreader round the lip of the basin, another discharging directly on to the water already in the pan, and a third for the after flush. As will be seen from the diagrams, the objectionable features were the angles formed in the outlet, and the earthenware "D" trap, which could easily remain fouled.

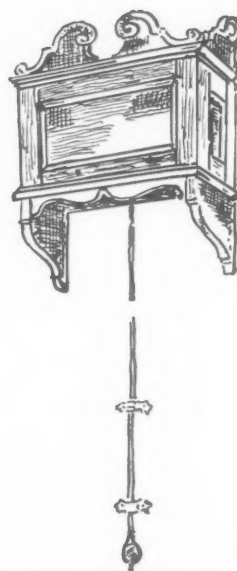
It was natural that such early efforts would soon be improved upon, and one of these is found in the "Pedestal Vase," patented by Messrs. Jennings,

and exhibited at the Health Exhibition in 1884. It received the Gold Medal award, and a technical paper at the time considered it "as perfect a sanitary closet as can be made" (21).

Some interesting official tests were applied to it, and the following seems particularly drastic: Ten apples, averaging  $1\frac{1}{4}$  inches diameter, and a flat sponge, about  $4\frac{1}{2}$  inches diameter, were thrown into the basin. The water, as well as the whole of the exposed dry surface of the pan was first blackened with plumbers' "smudge," and then the sides were covered with four pieces of thin sanitary paper which adhered closely to the soiled surface. The two gallon flush was then liberated. After seven seconds—the time occupied by the discharge—a receiver placed under the trap outlet was removed. It was found to contain in the blackened water, all the apples, the sponge and the four pieces of paper. It was noted that there was not a trace of soil visible on any part of the apparatus.

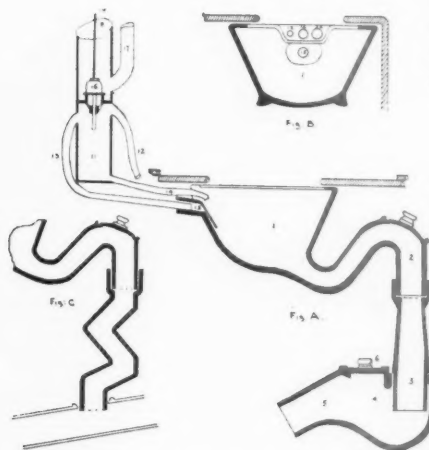
It may seem that this term "Pedestal Vase" is a somewhat grandiose title for so mundane an object as a water closet. But it must be remembered that at this period in the nineteenth century a date had been reached when the w.c. was cloaked with a certain amount of dignity, and it was not uncommon to find it installed in a carpeted room, mounted on a platform. A stepped dais certainly gave it added importance in the eyes of its owner, though the technically minded knew that such raising of the closet was only a means of overcoming difficulties with the trapping when the thickness of floors, or the presence of beams, made fixing awkward.

Although all praise is due to those whose efforts raised the w.c. to such standards, they are bound to be viewed today with the same mild amusement



21. (top): Section through the "Pedestal Vase" of George Jennings. It was awarded the gold medal of the Health Exhibition, held in London in 1884.

22: Sketch taken from an early catalogue of George Jennings: the "Pedestal Vase" has no mechanical parts. It is a simple basin and trap of improved design, with effective flush.



20: Mann's syphonic improvement for water closets and other sanitary appliances (patented, 1870). Fig. A: longitudinal section. Fig. B: transverse section of basin.

Fig. C: alternative form of outlet.

as that which greets the production of a Victorian photograph album. Thus, we see in an early catalogue of Messrs. Jennings, how the "vase" has been discreetly camouflaged by willow patterning, and the cistern politely disguised by a carved boxing of wood (22).

By way of contrast, the low level type designed for the new R.I.B.A. building by the same firm, is worth noting. The heavy white enamelled fireclay closet has a red mahogany seat, and both trap and cistern, with three gallon flush, acting silently, are concealed behind the wall.

Experience has shown that the syphonic closet is superior to the wash-down, in which the contents of the

basin are discharged by the overflowing of the trap. The reduced size of outlet necessary to ensure syphonic action has, within reason, advantages from the health aspect as the bowl can be emptied more powerfully and quickly. The noise from the flush has been one of the difficulties to be surmounted, for few sounds are more disconcerting or annoying than the sudden rush of water, followed by hissing as the cistern refills. Various firms, each specialising in sanitary appliances, manufacture models which reduce this to a minimum. One such example is the silent acting closet, called "The Venetian," which is fitted with the low down type of cistern operating more

quietly than the overhead, and its design necessitates a second trap—an advantage from a sanitary point of view.

As regards the valve type of flush, which requires no interval for filling between each discharge of water, manufacturers are confronted by objections as to possible waste of water. This pattern depends on water pressure to retain a plunger on its seating, and when water authorities permit its use they usually insist that its supply be fed through a meter. In some valves a method of meeting their prejudices is provided by a device which automatically closes the valve, whether the handle is released or not, after a pre-determined quantity of water has been discharged.

With these developments there has been a parallel improvement in w.c. planning. This has now reached a more or less standard size, averaging 6 ft. by 3 ft. It must, unless mechanically ventilated, have at least one side on an external wall, and comply with certain regulations as to ventilation and



24: A low down closet with a valve cistern. Compared with the present models, this 1907 design is now very out of date.

### THE LATEST DEVELOPMENTS

That progress in water closet design is still possible was shown at the recent Building Exhibition where a new closet was shown for the first time (25).

The chief feature was the fact that the closet was without the usual flushing rim, and although the bowl was larger, the overall dimensions had not been increased. The flush was accurately and efficiently directed so that it cleaned the bowl to the top, accurately and thoroughly.

A further point was noticeable in that it sloped backwards and was from 12 ins. to 13 ins. high. Such a design is likely to accord with the feelings of the medical profession who would like to see the height of closets reduced from the more usual 16 ins. (28). Although most sanitary firms can supply a pattern on these lines, it is largely ignored by architects and the building industry generally. It should be emphasized, nevertheless, that the ideal position for disposing of the waste matter from the



25: The latest pattern closet as seen at the last Building Exhibition. It is without the usual flushing rim, and is made in heavy fireclay with sloping back from 12 ins. to 13 ins. in height.

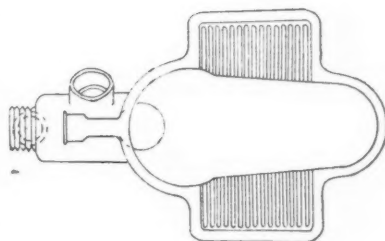
body is the squatting posture adopted by Eastern races (26). A closet has been designed for their use, but it is thought to be unsuitable for the European (see also 28).

Regarding further progress in w.c. design, there is the attitude adopted by water authorities; their stringent regulations regarding the quantity of water used for flushing purposes makes improbable any revolutionary advancement in this branch of sanitary science.

In spite of the opposition of the water boards, manufacturers are none the less making efforts to improve their products, and a pressed steel cistern is now on the market giving a pleasant smooth external finish and increased immunity from damage by frost, since pressed steel is far more elastic than cast iron.

### THE "AERIAL W.C."

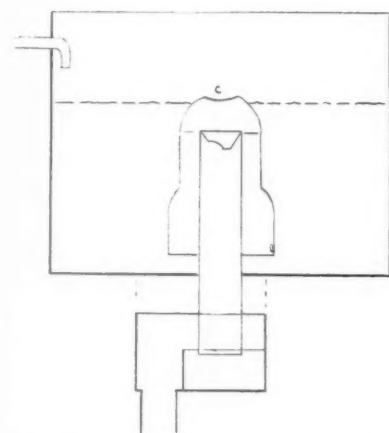
To conclude this section, it might not be out of place to describe, briefly, the methods adopted in aeroplanes for the disposal of sewage. Imperial Airways, for example, have studied this problem very deeply, though they would be the first to admit that in all its aspects a satisfactory system of sanitation has yet to be perfected. Regulations strictly lay down that no solid matter must be discharged whilst in the air, and so the first method for exploitation was by providing a w.c. of the Elsan type with



26 and 27: The Eastern pedestal closet. In this type of closet, which is really the most rational of all, though only suitable for native races, it is necessary to adopt a squatting position for use. This modern product provides an interesting comparison with the fifteenth-century example at Agra (29).

a container which could be emptied on landing.

It was found, however, that this apparatus was somewhat unsightly and not entirely satisfactory, and so the



23: Fields' automatic flushing tank. One of the original cisterns (now in the Parkes Museum of the Royal Sanitary Institute) with which Roger Fields experimented. When the flush has ceased, water enters the tank through the supply pipe at the top. On reaching the level of the stand pipe or "syphon leg," it proceeds to trickle down the centre of the stand pipe, carrying with it a certain amount of air, thus causing a partial vacuum in the stand pipe. In time, air pressure in the stand pipe is so lowered that normal air pressure exerts its force on the surface of the water contained in the tank, and so completes the syphonic action. There are two traps in this cistern. Dome "C" and the top of the stand pipe form one, and the bottom of stand pipe and trapping box the other.

position. The apparatus itself is constructed today on severely practical lines and needs no disguise. The only concession manufacturers make towards improving it in appearance is to colour the ware to harmonize with the tiling with which nearly every w.c. is now usually lined.





28: A modern closet based on the principle of the Eastern closet. The low squatting posture, considered ideal by medical authorities, is not suitable for Europeans, and so this design has been evolved as a compromise. It is the usual w.c. in design, but is only 14 ins. high at the front as against the usual 16 ins. It also slopes backwards to 12½ ins., which throws the body into a healthy anatomical position for daily use. It has the advantage also of being admirably suited for children.

next experiment was made by providing a closet with a valve, through which the soil fell into a tank in the floor. For reasons of weight it was impossible to provide the normal two gallon flush, which would be equivalent to 20 lbs. A means of flushing by a squirt was consequently tried, but it was found that, whilst admirable for cleaning within the throw of the jets, it left much to be desired, as the water did not scour the bowl enough, particularly after use by air-sick passengers.

An improved type of closet was then produced in which a jacketed pan was fitted beneath the seat. This contained sufficient water for about 30 flushes, it being necessary to tip the pan after use to discharge the contents into a container beneath.

Although this model was adopted on a number of air liners for some time, it was found, after a considerable amount of experience had been gained, that the pan was insufficient in capacity for the number of flushes needed to cleanse the pan thoroughly, and that a force flush was essential for this purpose.

As a result a compromise was obtained by using a system which circulated the chemically sterilized fluid from the container by a pump. This removed the various difficulties found in earlier systems, as it was found possible to flush the pan an unlimited number of times without any separate water-supply tank, and to obtain the necessary force to clean the surface thoroughly.

Thus the principle of sewage sterilization by chemical treatment was retained; there is no offensive odour from the sewage or flushing medium, and any solid matter in the container is segregated by means of a filter.

This new closet consists, therefore, of a sewage container, and an outer casing and shaped pan fitted with seat and pump. These parts, with the exception of the seat and pump, are manufactured in aluminium which is treated by a special process to protect the surface from staining and corrosion. The two essential requirements of aircraft design—space and weight saving—have thus been fully met, and it is possible on the larger types of air liner to instal two closet compartments.

## 2: BATHS AND BATHROOMS

Sanitation and its development through the ages cannot be completed without some references to the evolution of the domestic bath, which has gone through stages in design quite as remarkable as those of the water-closet.

### B.C.

Once again it is necessary to step backwards to the days of the early Egyptians, for bathing to these progressive and extremely ingenious people

was a matter of great importance and played a large part in their everyday life.

By studying the records already referred to, it is found that, just as the w.c. has retained today a form somewhat akin to that evolved by the Egyptians, so does the modern bath bear, in many of its features, characteristics which are startlingly similar.

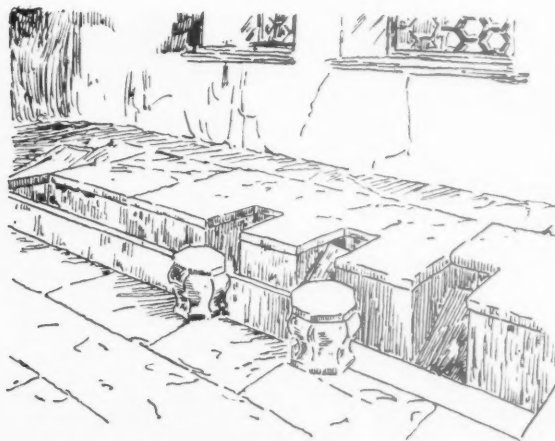
An important point in the planning of the Egyptian house was the lustration slab, with which every house of importance was provided in addition to the bathroom. It was placed in a conspicuous position in the central hall, which might be regarded as the main living-room, and which was surrounded by the other apartments. This lustration slab was usually of limestone with a raised edge. It had a small channel at one side to lead water into a vase placed in a hole in the floor to receive it. In effect it was, therefore, an early form of lavatory basin, for it was the custom of Egyptian households to wash their hands and feet before, and sometimes during, meals. They accomplished this by pouring water from a vase which possibly contained natron—a form of carbonate of soda.

The bathroom in the house was usually in close proximity to the closet, and was generally a small room with a limestone slab in one corner. Sometimes two upright slabs were placed against the walls to protect them from splashing. As before, the waste water ran into a vase in the floor below, or else flowed through a short earthenware pipe in the wall into another vase outside (31).

In the best houses the suite of the master was very conspicuous, and the bath slab stood behind a screen in what was called the anointing room. This conclusion was arrived at by the finding in one house in the City of Ahkenaten of a long block of limestone together with three cups which bore traces of grease.

Perhaps the closest resemblance to the modern bath was that specimen found at Knossos on the site of the royal palace (33). This particular bath was made somewhere about 1700 B.C., and was of hard earthenware decorated in relief. It is presumed that the bath, which was 5 ft. long and tapered, was intended for sitting in rather than lying. The bottom was graded from 20 ins. at one end to 11 ins. at the other.

There are ample records to show that the Romans regarded bathing as much more of a ritual than the Egyptians, and except for the development of the built-in plunge bath, heated by means of hypocausts, it cannot be said that they contributed much toward the use of the bath in private life. Such examples as exist show that the Romans preferred to build their baths as public institutions, though in many of the larger houses bathroom suites were



29: Marble latrines of the fifteenth century at Agra, India. These marble latrines were in the Harem of Shah Jehren in Agra, India, in the fifteenth century. Perfumed water ( otto of roses ) ran along the channel. On the two octagonal bases were placed vases containing scented water for dipping the fingers in. Beneath the centre of the latrines there was a well about 60 ft. deep, with a river running through at the bottom.



provided. These included such apartments as sweating and perfume rooms, and were more in the nature of Turkish baths, as we understand them, than separate compartments where individuals could bathe singly.

## THE CEREMONY OF THE BATH

Although the practice of public bathing fell into disrepute in the Dark Ages—that is to say, from the early days of



31 : An early Egyptian bathroom. The limestone slab in one corner has a channel waste leading to a vase in the ground. Note the "splash-back" slabs. (Photograph by the Egypt Exploration Society.)

30 : A lady bathing in the presence of a knight. An illustration from a thirteenth-century manuscript of the *Romance of Merlin*, in the British Museum.

the ninth century until the latter part of the fifteenth, as it was supposed to lead to immorality—there are records which show that the ceremony of the bath could be carried out with perfect propriety.

What could be more delightfully human, for example, than that illustration from a thirteenth-century MS., now in the British Museum? It is taken from the *Romance of Merlin* and depicts a knight paying court to his lady, whose bath is a very ample tub (30).

To what use the wooden tub could be put is well shown by a drawing published in Brussels in 1514 (32). At this period there was "*La régence de santé*,"

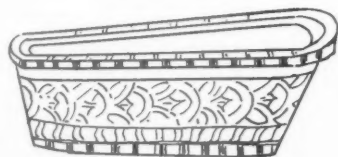
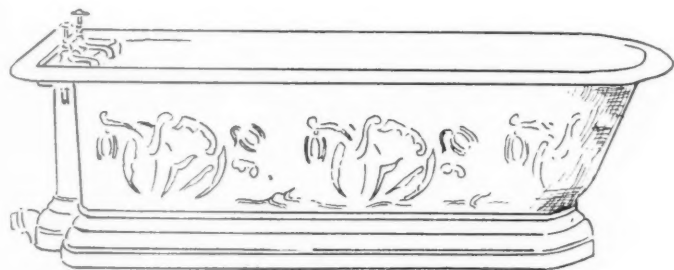
and patrons would foregather at medicinal establishments to take the cure in happy promiscuity. Such establishments thrived in the reign of James I, for an illustration from a pamphlet of the time shows a decidedly festive gathering at a public bath-house (34). At the end of the sixteenth century,

*al fresco* bathing still seems to have been popular, more particularly when food and music were added to the pleasures of hot water, as is seen from another MS. of this date (35).

The bath played an important part in the inauguration of knights, for it was regarded as a symbol of purity.



32 : From a MS. published in Brussels in 1514. It depicts a medicinal bath in very domestic surroundings. The tub is of very large proportions.



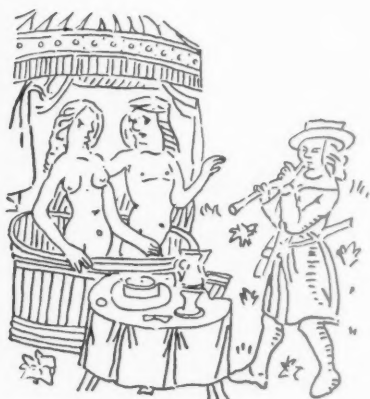
33 : Left, a hard earthenware bath from the Palace of Knossos. It dates from about 1700 B.C. In general design it is not very different from the bath of thirty years ago, above, which is in cast iron and is taken from an early catalogue of Adamsez.

Froissart describes how "on the Saturday before the Coronation of King Henry IV, the King went from Westminster to the Tower of London with many followers; and all the esquires who were made knights on the next day to the number of 46 watched all that night, each of whom had his chamber and his bath in which he bathed, and the next day the Duke of Lancaster made them Knights at celebration of Mass." Following this ceremony, the knights were presented with beds, or bed covers, though from a drawing in the *Romance of Alexander* it appears that a cover for the bath was an equally welcome gift (36). The last knights created in this ancient form were those at the Coronation of Charles II, in 1661.



34: An illustration from a pamphlet, "Tittle-tattle," published in the reign of James I. On the left, bathing in tubs, with refreshments being served at the same time. On the right, an animated conversation between waiting bathers seems to be in progress.

The presenting of a cover for the bath seems to suggest that at this period it had been decided that the custom of taking a bath was something that should be carried out in private. Two centuries later the cloth covering became one of wood; enabling ladies to give audience to their admirers with perfect modesty.



35: Bathing in comfort with food and music is illustrated by this drawing from a MS. of the end of the sixteenth century.

Beau Brummell is said to have introduced the habit of taking cold baths into England at the end of the eighteenth century. It found favour with the Prince Regent, and was also approved of by leaders of fashion, and gradually spread down the whole social scale.

### PROGRESS IN BATH DESIGN

Such an example did much to stimulate bath design in this country, though it did not lead to bathrooms being considered a necessity in domestic design, and so public wash-houses were constructed for the benefit of the public.

Nevertheless, individual persons expected to be able to bathe in their own homes, and so, from the wooden tub of the past, the hip bath was evolved. It was made of enamelled iron and was a popular item of domestic

furniture well into the Victorian era. There are many who will remember the labour involved in the carrying upstairs to the bedroom of cans of hot water, and the subsequent business of baling it out again.

This type of bath naturally lent itself to further improvement, and some ingenious designs were put on the market, judging from the illustrations from a catalogue of about 50 years ago.

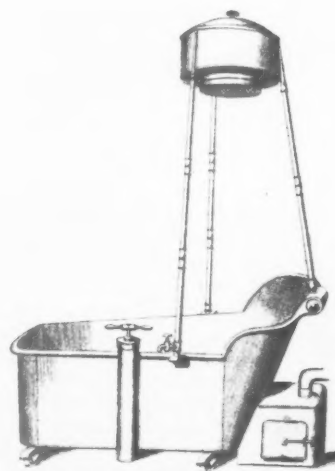
In these models, it will be noted, the problem of heating the water had not been overlooked. In addition there was the luxury of a shower, for which the water was supplied by pump attached to the bath. The gas-heated bath was also another ingenious contrivance, though one does not like to contemplate the plight of a bather who sat in it without first turning off the gas and allowing the bottom to cool (37 and 39).

The progress made in hot and cold water supply enabled manufacturers to improve upon baths of the fixed type, though they generally seem to have agreed that a bath could not be a bath unless some form of shower was attached. Consequently one finds that some very elaborate specimens were put on the market. One maker, seemingly impressed by the dignity of the four poster bed, produced a bath in which the shower was contained

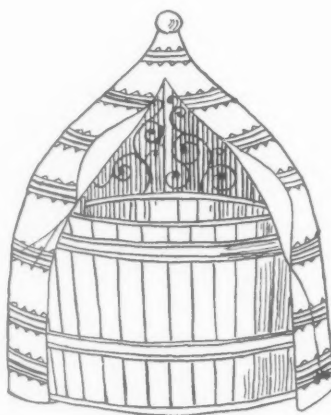
in an elaborate "baldachin" of zinc (42), while another suggested a hood of particularly strong construction (40). In the light of progress today, both of these ideas seem strange when compared with the unobtrusive "telephone" type of chromium plated spray which can be attached to the twentieth century bath.

Whilst the general shape of the bath has not altered greatly of recent years, various space and waste-saving devices have been tried. Some of these, published recently in an American magazine, suggest ingenious alternatives. One such idea was to place the bath diagonally, in such a fashion that it would take up very little more room than the present-day shower bath compartment. Another suggestion was to make the bath rather like the shape of a recumbent human being (38).

Yet another proposal was to make the bath with a stepped bottom only suitable for sitting in. This last scheme



37: The universal high back taper bath. An ingenious model complete with shower and heating stove. (Illustration from an early catalogue of George Jennings.)



36: A bath with an elaborate cover. An illustration from a manuscript of the Romance of Alexander.

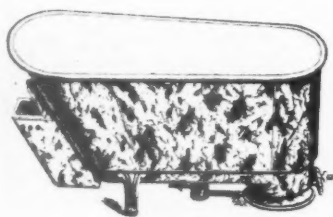
was enlarged upon about two years ago by the International Bath Association, who promoted what they called a 5-Purpose bath (41). It was intended to supply the need of the smaller house owner, or in property where there was no bathroom. In addition to facilities for bathing, the bath provided a kitchen and dining-room table, a lavatory basin, sink and facilities for laundry work. Although admirable in many respects, and quite practicable where it could be placed near an external wall to facilitate plumbing, it conflicted somewhat with the views of the Ministry of Health, who did not think it satisfactory to encourage the idea of a sitting-room or kitchen being associated with the bathroom in houses of the artisan type.

Of greater value to the building industry, however, was the Association's



38: Some space-saving ideas for the bath. Above is shown the diagonal bath. Top right, a bath in the shape of the human form. Bottom right: this stepped shape appears to have been furthered by the 5-purpose bath of the International Bath Association.

step towards standardizing the size of the bath to an overall dimension of 5 ft. 1 in., which would render it suitable for the needs of housing schemes. The main feature of this type of bath, which has found a great demand, is that it saves hot water. This is achieved by slight variations in the shape, which enable the 28 gallons of water used in the average bath to be reduced to 20 gallons, and allow at the same time a



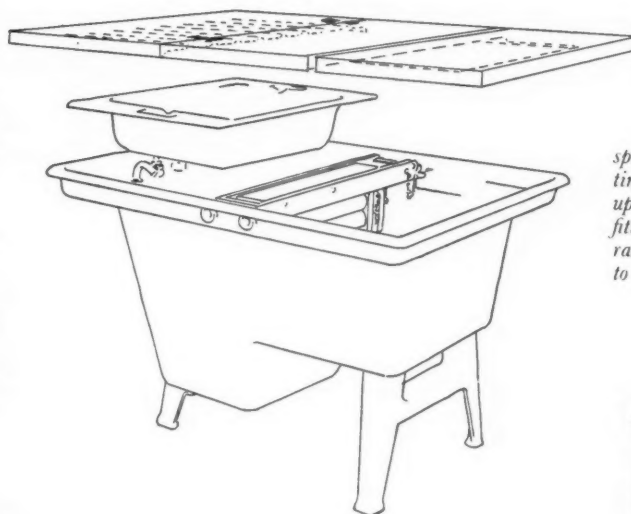
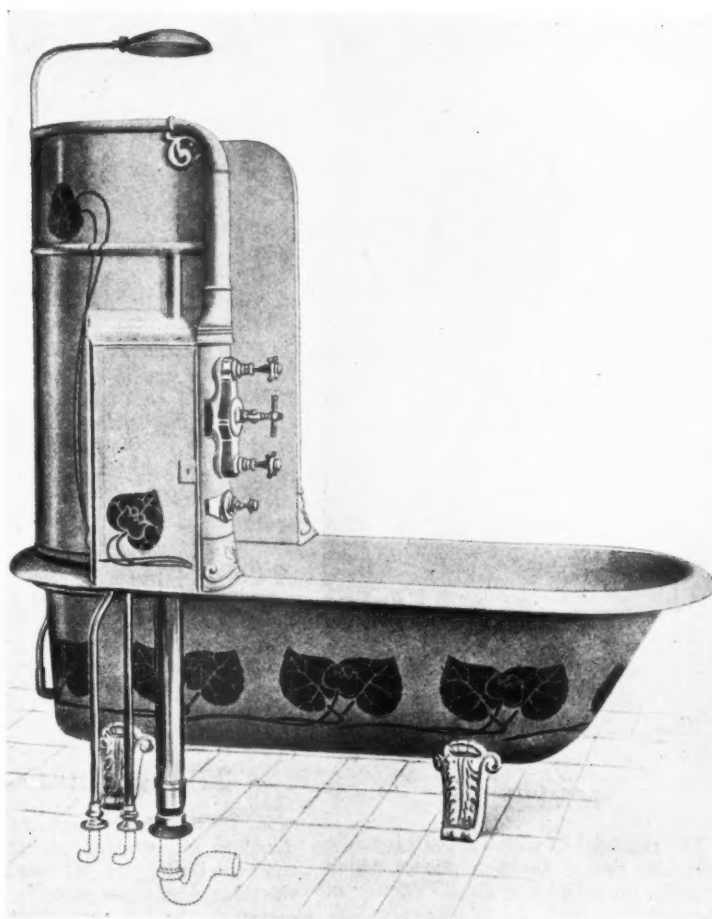
39: A cottage gas bath. "Either a large or small quantity of water can be heated at pleasure (quickly)." (Illustration from an early catalogue of George Jennings.)

greater depth of water when the bath is occupied (45).

Apart from this standardization of the size of the modern bath for certain classes of user, dimensions vary according to the space available in the bathroom, and so they are generally supplied in overall lengths from 4 ft. 6 in. to 6 ft. and over.

## LAVATORY BASINS

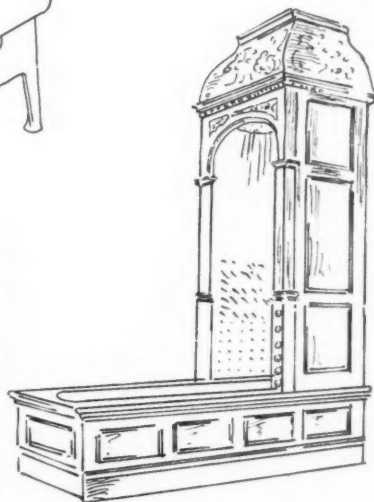
Side by side with the evolution of the bath, equal progress has been made with the lavatory basin which, as has previously been mentioned, owes its origin to the lustration slab of the early Egyptians. The later adaptation of this may perhaps be seen in the tip-up type as illustrated in that quite delightful drawing from an old catalogue. From this it was but a short step to the swinging lavatory basin which could be attached to the wall by brackets so that it discharged into the bath or closet (43 and 44).



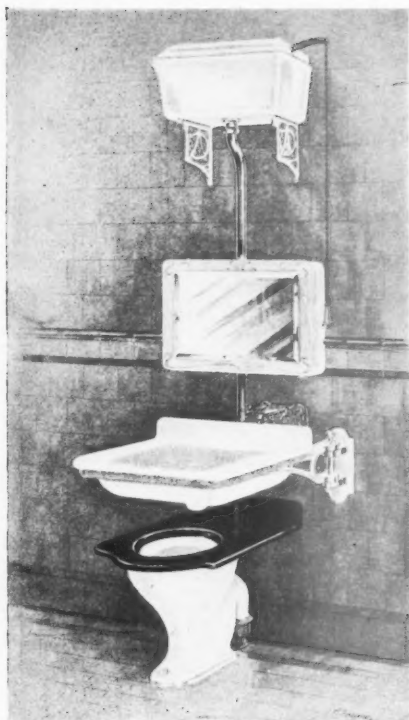
40: The Hooded Bath of 1907. In cast iron with nickel plated exposed copper stand pipe, and hot, cold, waste, spray and shower fittings and hinged lock-up door for access to fittings. The price ranged from £30 8s. to £46 8s.

41 (above): The 5-purpose bath of the International Bath Association: 1: A strong table for general use; 2: kitchen sink with draining board; 3: washing basin; 4: home laundry with wringer; 5: bath for adult or child.

42 (right): This strong copper plunge bath with imposing enamelled plate zinc hood was placed on the market about 50 years ago to bring improved appliances within the reach of all. The price of the bath was 16 guineas at 6 ft. long. Hood complete: £12 10s. Buttons are: hot, shower, douche, spray, plunge and cold.







## MATERIAL

The material of which a bath is made has also passed through phases which can be traced in the remarks made of its evolution (59).

At the end of last century, tinned and enamelled baths in wrought copper were put on the market. It was claimed that this material maintained the heat much longer than porcelain, and compared favourably as regards appearance and cleanliness. Many public and private buildings adopted them, though ultimately the price of copper led to their disuse.

Baths in marble and slate have also had a vogue, particularly in cases where the bath can be of the plunge type and is sunk low in the floor. For general use, however, the bath is usually of glazed fireclay or porcelain enamelled cast iron. The boxed-in bath is now becoming almost universal, and in many cases it is built into a recess with a detachable front panel or other means of obtaining access to the trap. It is popular, since all unsightly pipes can be concealed.

Taps, too, have undergone changes in design of recent years, and a chromium or nickel plated finish, or white porcelain-enamelled iron, has superseded the brass valves which are a labour to keep clean and bright. The steamless inlet is a good innovation, used with a mixing valve to equalise the different pressures exerted by hot and cold water. It is a great hot water saver, since the temperature of the bath can be adjusted to a nicety. Moreover, the possibility of bathroom walls sweating is reduced to a minimum.



43: A patent swinging lavatory basin where space and money are considerations. If required a swan-neck waste was supplied to make it impossible for a careless person to let water flow over the bath edge. The price of this model was £1 12s. 6d. Taken from a 1907 catalogue of Adamsez.

44 (left): Produced in 1907 by Adamsez for utility and economy. A w.c. with a swinging lavatory basin. It was priced at £12 17s. 6d., including the mirror. Although a comparatively recent suggestion, it seems strange in the light of present-day design and progress.

## THE BATHROOM

No apartment, perhaps, in the modern dwelling has undergone more change than the bathroom. It has been called the most dangerous room in the house, owing to the fact that there are more accidents in it than anywhere else in the building. It has been said that at least 100,000 people are injured in bathrooms, per year, by slipping on wet floors, gas poisoning from geysers, or by electrocution and shock from heaters and lamps. But I do not doubt that, since this statement was made a few years ago, statistics will show that such risks have been very considerably reduced.

In the light of modern progress, it is obvious that the bathroom offers great scope for design and treatment by reason of the wide range of materials and fittings now available. In practice, it varies from a small tiled chamber on severely practical lines, to what virtually amounts to a beauty parlour complete with a full complement of fittings.

## 3: PLUMBING: PAST AND PRESENT

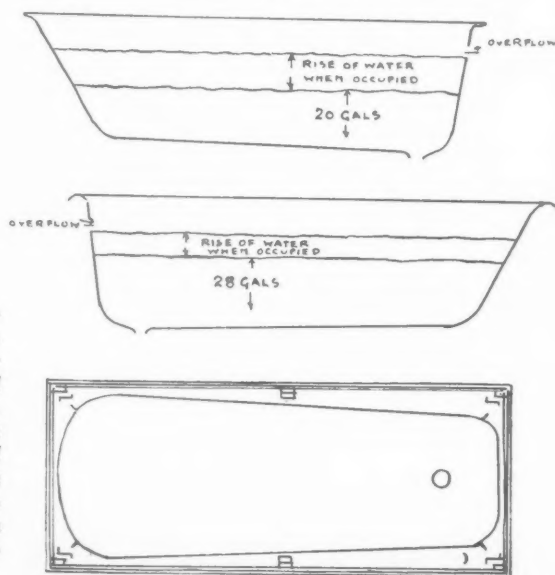
The provision of w.c.s, baths and other fittings is closely linked with plumbing, for without it the carriage of water would be a difficulty which would make its supply impossible. From what has been outlined elsewhere in these notes, it will be seen how much depends on this branch of sanitary science.

## EARLY PLUMBING

Except for the provision of channels or earthenware pipes for the carriage of waste water from bath and lustration slabs, the early Egyptians were not greatly concerned with problems of plumbing. The photograph by the Egypt Exploration Society shows very clearly the method adopted by these people several hundred years B.C. (48).

An account of the Roman baths in Bath, by the late Mr. S. Sydenham, discloses how the Roman plumbers went to work in this country.\* It is thought that they obtained the lead for their pipes from the Mendip Hills south of Bath, as various pigs of lead bearing the Roman stamp have been found. To form the pipes the Romans bent the sheet lead into the shape of an oval

\* *The Plumbing Trade Journal*, February, 1930. Published by The Institute of Plumbers.



45: The suggestion of the International Bath Association, Ltd., for saving water in baths. Their standard bath is shown at the top. It will be seen that, although shorter, less water is used and a greater depth when occupied. It may be compared with the ordinary bath in the centre. Plan of boxed-in standard bath below.



pipe, which they filled with sand or some other material while they made the joint. The edges of the sheet were bent to form a channel down which molten lead was poured. By this process the seam was formed. It is interesting to note, too, that lead pipes in 9-foot lengths, connected by soldered joints, have been discovered which bear a strong resemblance to the lead piping of today.

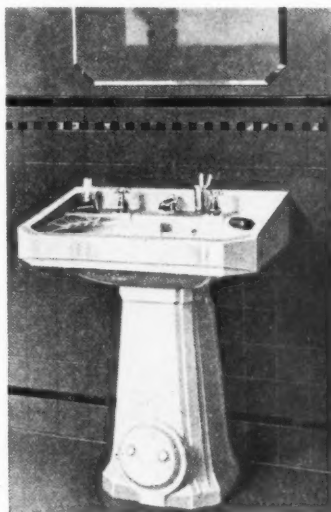
Palladius, however, in his treatise *De Re Rustica*, shows an aversion to lead as liable to become corroded, and this tended to restrain the general use of lead by the Romans. Vitruvius supported this view in recommending pipes of earthenware as being cheaper and more wholesome. They were not glazed, but washed or puddled with "favilla" or fine wood ashes.

For some extraordinary reason the plumber and his mate have been the butt of more jest and humour than almost any trade in the building industry. But in a paper dealing with ancient plumbers in Cambridge, the writer remarks that the indebtedness of Cambridge to the craft of the plumber is, as regards water supply, outstanding in respect of the early time at which it began.\* In 1325 the Franciscan Friars (Greyfriars) laid leaden pipes which supplied the friary and commonality of Cambridge in much the same way as did those monks of the London Charterhouse, which has been discussed in the first section of this article.

From a very early period the building trades kept themselves distinct, and so the monasteries included in the various handicrafts, the plumber and his boy. In an agreement made at York, in 1367, it was arranged that the plumber was to work with his own hand whenever required by the "master of the fabric." But if he was not needed he could obtain leave of absence from the chapter or "magister operum," for this clerk of works was a most important official in every monastic establishment.

Side by side with the employment of lead for conveying water there seems to have been a wide use of wood for water mains, and many examples of wooden conduits have been found in an excellent state of preservation.

Such a use of the wooden pipe is by no means obsolete today. A good instance is provided by the river Loire, the longest river in France. At its source at Mt. Gerbier de Jonc, in the Cevennes, it springs out of the rocky soil and is conducted along the first few hundred miles of its journey by hollowed-out saplings which butt into one another. So small is the bore that it is possible to stop the preliminary flow of this great river with the palm of the hand.



46: The latest development in lavatory basins. In the pedestal there is a heater tank. The electric heater will maintain the water by thermostat so that it cannot boil dry. Only a cold supply and waste pipe are necessary. Price complete with electric heater and chromium-plated fittings is from £18 15s. to £20 15s.

## FURTHER PROGRESS

From what has been stated regarding the opinion of the Romans as to the use of lead, it must not be concluded that it is not a valuable and tested material for plumbing work. Some interesting facts regarding it are disclosed in Mr. Bertram Hellyer's excellent brochure which I am again enabled to consult.

During the eighteenth century, service, soil and waste pipes were made of cast sheet lead bent to pipe shape with soldered seams. Later, rolling mills were set up, and about 1820 drawn seamless lead pipes were made under hydraulic pressure. These superseded the old seam pipe. Box drains and brick barrel drains were also still in use.

In 1845 the first stoneware drains were made for the Holborn and Finsbury Office of Sewers, and a year later Sir Henry Doulton began making "pipes of pottery." There is a record about this date which states that near Lincoln earthenware "tiles" were found. They were 22 in. long and 6 in. in diameter and were set in a thick casing of cement to exclude air. They conveyed water for about a mile and a-half. By 1870 stoneware drains became almost universal, and all service, soil and waste pipes were made of lead.

Plumbers may care to know the rate of wages at this time. These it will be seen rose rapidly as the demand for plumbing increased. In 1837 the plumber was paid 4s. 6d. per day. In 1844 this was increased to 5s. per

day, and he was expected to work from 7 a.m. to 5.30 p.m., Saturdays included. Ten years later the rate rose to 5s. 6d. per day. In the following year it was maintained, but he was allowed to knock off work at 4 p.m. on Saturdays. The next period to be recorded is that from 1873-1892, when he received 10d. per hour and his mate 5½d.

Towards the end of the nineteenth century, sanitation improved immeasurably, and the diameter of drains, soil and waste pipes was reduced in size to make for better cleansing. Stoneware pipes which had, up to now, been made with clay joints were cemented and iron drains began to replace stoneware in London when the drains had to pass under buildings. Messrs. Dent and Hellyer fixed the first iron drain in the City of London. Great efforts were also made to render drains watertight, and so smoke and water tests were applied instead of the old peppermint and smoke rocket tests. Manholes were also being rendered in cement to make them watertight.

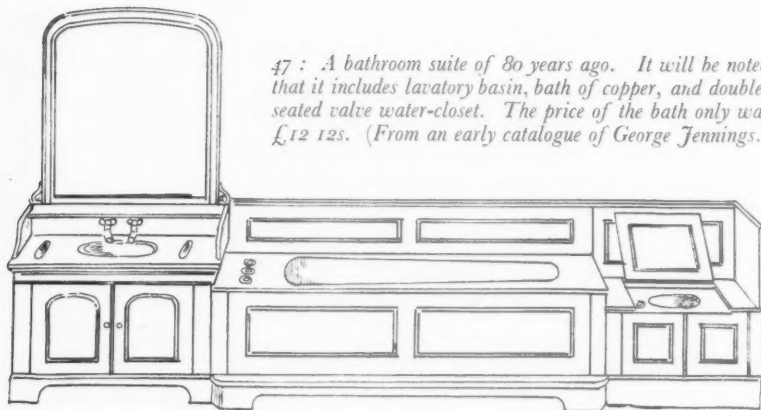
The excellence of the plumber's work of over fifty years ago is well illustrated by the sanitary system of a London restaurant which is, I understand, still in perfect working order and contains the whole of the fittings exactly as installed (see page 385). A description of this work was published in "The Sanitary Engineer," New York, on August 9, 1883, and since this is surely unique in plumbing history, some extracts from this account are perhaps permissible.

The nine lavatory basins are on the "tip-up" and "lift-out" principle, of white porcelain, with navy blue and gold rims, with veined marble tops and nickel-plated hot and cold supply taps. Each three basins discharge into glazed earthenware receivers connected with the trap by a lead junction-piece. The three water-closets are earthenware valve closets with decorated basins and nickelled fittings.

The seven urinals, which are a principal feature in the room, are back outlet lipped flushing rim basins of white earthenware. They have polished black marble backs, with sides and divisions of white veined marble. The floor to each stall is of slate, dished to a central perforation, under which is placed a glazed earthenware drip-basin, also provided with a flushing rim. Over the range at each end is an automatic intermittent flushing cistern, arranged to discharge alternately at periodic intervals to flush the urinals, drip-basins, pipes, and trap, the latter, fixed immediately under the end drip-basin, being easily accessible for inspection and cleansing.

The water-closets, bends, branches and soil pipes are 4½ ins. diameter of eight-pound lead. The main pipe is extended to roof level, full size, and

\* *Ancient Plumbers in Cambridge*. By Dr. A. H. Lloyd, F.S.A. *The Plumbing Trade Journal*, January, 1933. Published by The Institute of Plumbers.



47: A bathroom suite of 80 years ago. It will be noted that it includes lavatory basin, bath of copper, and double-seated valve water-closet. The price of the bath only was £12 12s. (From an early catalogue of George Jennings.)

terminates in a fixed exhaust ventilator. The lavatory waste is 3 ins. diameter of 12-pound lead pipe, being of special strength to withstand the action of hot and cold water continually passing through it. The urinal wastes, 3½ ins. diameter, are of eight-pound lead, with a 4-in. trap. Each fitting is independently trapped, and all bends and traps used are the American drawn-lead pattern.

All wastes are arranged in lengths, with caps and screws at junctions and intervals, as necessary. The work was planned and carried out under the personal supervision of Mr. George Jennings, and, with the exception of the wall tiling and stained glass windows, all appliances, fittings and material used were prepared in his shops. The cost of fitting up this lavatory was about £1,000.

### ANTI-SYPHONAGE TRAPS

The rapid adoption of the one-pipe system of plumbing has produced a large number of "deep-seal" traps to counteract the greater vacuum, and these types are now widely used in all positions, particularly in hospital work, where a thoroughly efficient seal is desired. The types on the market range from the normal deep seal, which is made on the usual lines but gives a seal about 1 to 1½ inches deeper, to the types which have a special chamber containing an extra supply of water to give a permanent seal under persistent suction.

### COPPER IN PLUMBING

Before the War only lead and iron pipes were used for water systems owing to the prohibitive cost of copper. But its increased use since then is bringing about a new era in domestic engineering, for it is an amenable metal which can be easily worked. The technique

of copper is not so difficult for the plumber as that of lead, for where a lead pipe will have a wiped joint, copper pipes will be screwed or else provided with a separate compression joint of cast brass or gunmetal.

Further points in copper tubing are that it does not corrode, has a low frictional resistance and considerable strength. It can also be bent with ease. The light gauge small bore copper tube is tending to replace the ugly sizes of water and central heating pipes which, in iron, have to be of wide diameters because of internal corrosion.

The greater use of copper has encouraged manufacturers to invent joints for use in light gauge tubing. In one of these, used at the Cumberland Hotel, the ends of the pipe are secured by a double ended cone, surrounded by a screwed tapered socket and locking ring with a rotatable tapered sleeve. The copper pipes to be joined are expanded by a special tool, which is hammered into the bore up to a certain mark. The double cone fits this expansion and, by tightening the lock nut, a completely watertight compression joint is made without altering the bore of the pipe. A ¾-in. coupling of this type was tested by being fitted to a 19 s.w.g. copper tube and it withstood a pressure of 5,000 lbs. per sq. in., against a dead end.

### NICKEL SILVER AND CHROMIUM PLATING

From the fact that brass in sanitary fittings becomes unsightly after a few hours use, it has been shown that for a good clean white colour, with sufficient tarnish resistance to retain it during comparatively long periods of neglect, an alloy containing 18-22 per cent. nickel is preferable. As a general guide it might be said that this costs no more than similar fittings in good quality chromium plate, and frequently less.

Chromium plating is, however, a popular finish for all visible taps, fittings and piping in sanitary work. Its success depends on the coating of nickel being interposed if it is applied to brass, and copper and nickel if the basis is iron. Chromium plating provides a very hard wearing surface which resists tarnishing better than nickel.

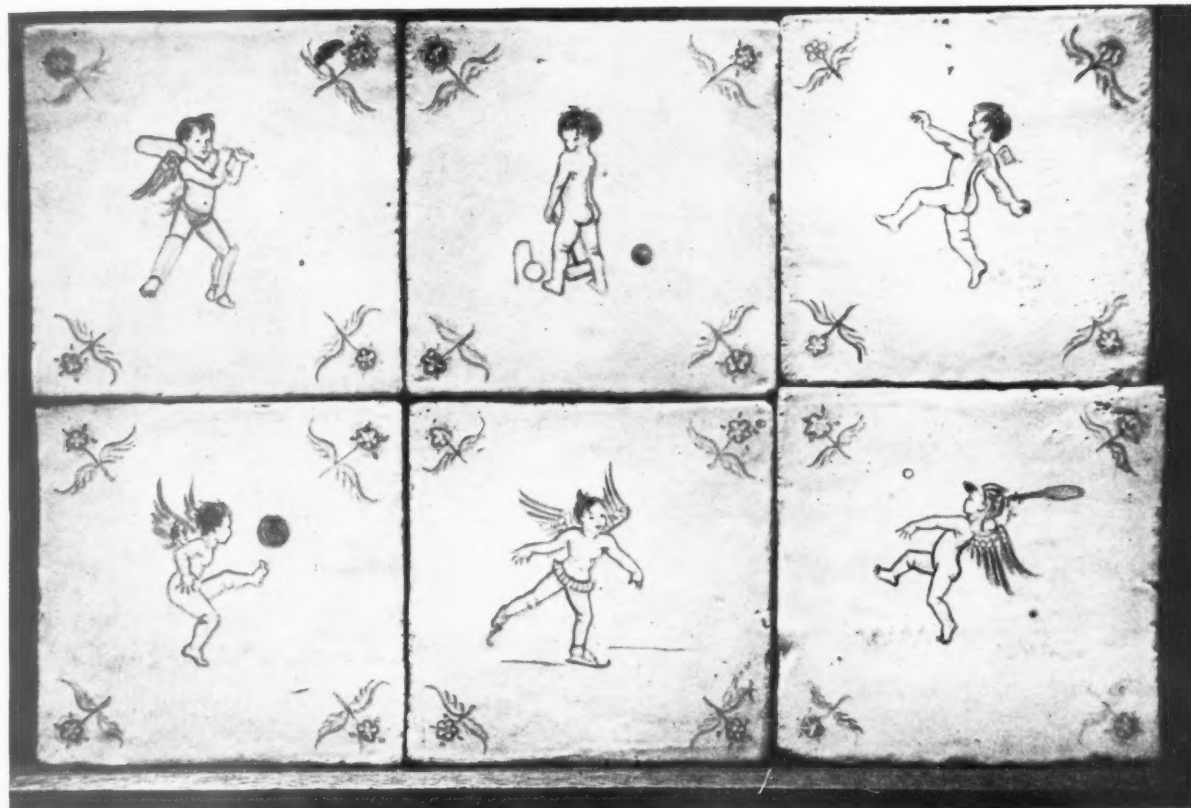
### SOME METHODS OF JOINTING PIPES

With a varied range of materials at his command, the scope of the plumber is considerably increased, and his activities cover a very wide and important field which has, of late years, been widened by the advent of oxy-acetylene welding. Bronze welding, it has been found, is certainly suitable for pipe line work, and has certain advantages over other methods, and a butt weld gives all the strength required. It is also a fact that joints made in mild steel pipe are as strong as the pipe itself, and in the case of iron, very much stronger. Thus, there is no need to fear if the joints made by these means give way under pressure in expansion strains.

To ensure a certain standard being obtained in plumbing work, the In-



48: Early Egyptian plumbing: an earthenware pipe leading from the bathroom to a vase sunk in the ground outside the wall. From the City of Tel-el-Amarna. (Photograph by the Egypt Exploration Society.)



49 : Bathroom decoration; the tiles are in white and blue.

stitute of Plumbers has wisely drawn up a series of specifications which lay down a minimum of sound practice, and provide codes to which reference may be made.

Every accredited plumber is familiar, or should be, with the various methods which are proper for the jointing of pipes in different materials, but for the benefit of those not so acquainted, they might form the concluding remarks on sanitation and its plumbing.

**Lead to Lead :** The joint should be of the kind known as a fused or burnt joint, or a plumber's wiped soldered joint.

**Copper to Copper :** Join with a compression joint made with union nuts or flanged or other approved couplings ; or by screwed joint or spigot and socket joint ; or by brazing or welding.

**Cast Iron to Iron :** Join with a gasket of hemp or yarn and molten lead or lead wool properly caulked ; the lead should be half the depth of the socket.

**Lead to Copper :** The joint should be of the kind known as a plumber's wiped soldered joint.

**Lead to Iron :** If lead is connected with the socketed end of an iron pipe the joint should be made by means of a thimble of cast brass, copper, or other suitable alloy connected with the lead

by means of a plumber's wiped soldered joint. The lead should be passed through the thimble and turned over the end. The joint to the iron socket should be made with a gasket of hemp or yarn and molten lead, or lead wool properly caulked.

**Lead to Stoneware :** A similar joint as that described immediately above, except that a mixture of equal parts of Portland cement and sand, or molten bitumen, should be substituted for molten lead or lead wool.

**Copper to Stoneware :** The joint should be made with a gasket of hemp or yarn soaked in liquid cement, the socket being filled with a mixture of equal parts of Portland cement and sand, or with molten bitumen.

**Iron to Stoneware :** The joint is as already described for copper.\*

## IN CONCLUSION

From what has been written in these sections dealing with many phases of sanitation, it can perhaps be concluded that there is still ample room for improvement in detail in many directions. A satisfactory method, for example, of

\* From *Minimum Specifications of Soil, Waste and Ventilating Pipes*. Published by The Institute of Plumbers.

bedding the bath against the wall face has not, I think, been arrived at. One maker provides a bath with a special upstand cast on to facilitate this. It is not entirely satisfactory and deserves further attention if the problem of forming a sound and lasting joint between a material which becomes heated and the colder surface of the wall is to be solved.

Architects, too, I feel, might take greater pains to render w.c.s and bathrooms more completely soundproof, particularly as regards buildings occupied by many persons or tenants. In many of the modern flats the neglect shown in this matter casts a very serious reflection on their skill and appreciation of modern sanitary requirements.

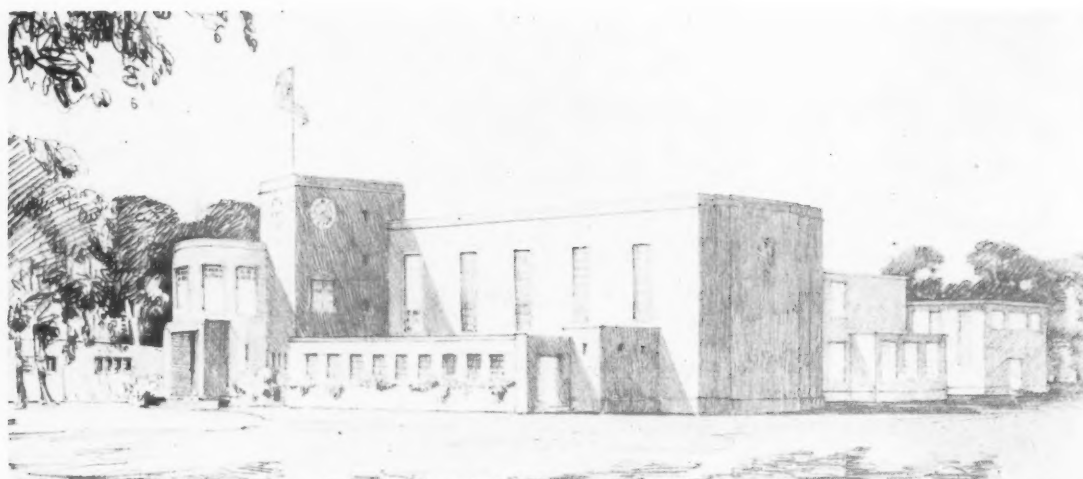
One thing is definite, however, and whilst no one knows what the future holds in store regarding the progress of sanitary hygiene, it is certain that the unhealthy conditions of living tolerated 200 years ago can never be repeated.

Aug. 24th, 1736.

A remarkably fat boar was taken coming out of the Fleet Ditch into the Thames. It proved to be a butcher's near Smithfield-bars who had missed him for 5 months.

All the time, it seems, he had been in the common sewer, and was improved in price from ten shillings to two guineas.





*A perspective drawing of the Girls' Modern School, Bedford, as seen from Cardington Road. Architect, Oswald P. Milne. This school, one of the schools of the Harpur Trust Foundation, is to be rehoused in new buildings to be erected on its playing field which is on the outskirts of Bedford, lying between the River Ouse and the Cardington Road. The school is planned with flat roofs allowing for future accommodation by the addition of another storey, and is to be built of local multi-coloured red bricks, stone being sparingly used for dressings. Ground and first-floor plans are reproduced on the next page.*

## LETTERS

FROM

## READERS

### Registration

SIR,—You have published a letter from Major Athoe; may I add a few words of independent comment?

No doubt the Secretary of the I.A.A.S. has spent time and labour in examining the Act of 1931 and several other members of the Registration Council wish this Act had been more happily worded, yet there can be no doubt that if the original Bill had met with less obstruction from Major Athoe and his friends the existing Act would have been more straightforward and more effective.

The present Bill aims to restrict the use of the title of Architect to those who can show reasonable qualification for this distinction—it will do much to raise the status of the profession. Indeed, Major Athoe was at one time anxious to introduce legislation to make it impossible for Local Authorities to approve building plans prepared by other than registered architects, so the principle at least of the new Bill must have his support!

His complaint seems to be that revision of the details of the existing Act is more urgent than the proposed measure, and thus it appears that he wishes to obstruct progress in one direction so that he may re-open the question of "ambiguities and inequities" in the existing Act. Yet these "ambiguities and inequities" are a cause of grievance to every one of the constituent bodies of the Council—it is not as if the Incorporated Association suffered alone—and it may well be argued that there are bound to be weak places in any Statute.

RAYMOND WALKER

JOHN MICHAEL

H. L. NATHAN, M.P.

Moreover, it is not as if the Act had been in force long enough to test thoroughly its advantages and shortcomings: in the light of future experience much of the criticism at present made against it may prove futile and unsound.

Surely, it is not unreasonable that the Registration Council wish to add to architectural legislation an Act that will greatly improve the status of the profession in spite of the shortcomings of the existing Act, or must we re-model the existing Act before being allowed to take another step? After all, you cannot expect Parliament to re-arrange its Statutes every few years to bring them in line with the moment—they have other things to do in Westminster.

To say that piecemeal legislation is useless suggests that Major Athoe was greatly influenced by the Duce during his recent visit to Italy; but since Englishmen prefer more gentle methods of making rules for future conduct, it is unlikely that Parliament would approve any other course to put the affairs of the profession in order.

Unless the Major can give us more logical reasons for opposition to the present Bill, I fear we may lose faith in the I.A.A.S. as a body primarily concerned with the welfare of architecture at large. As a member of the Registration Council for two years of its short life, I think Major Athoe would have more to gain by constructive co-operation with his fellow councillors. It is no use obstructing their attempts to promote a valuable piece of legislation

which can harm nobody except the unqualified practitioner who is doing so much to harm the prestige and financial security of the *bona fide* architect.

Major Athoe does not mention that such proposed legislation will mean added protection for the building public—has this escaped his notice?

RAYMOND WALKER

### Advertising and the Architect

SIR,—Mr. Gloag provides that entertaining spectacle—an "ad. man" on the defensive. Ad. men are divided into two classes—that which Mr. Gloag describes as moving in a semi-luminous mist, and that whose members know that advertising is a Science. These latter very often wear horn-rimmed spectacles; they smoke pipes and are crazy about Research. My remarks about advertising men who are idealist-reformers apply to both these groups.

Whilst being grateful to Mr. Gloag for his "reply," I am baffled to notice that this turns itself about half-way through into an eager endorsement of what I wrote in my article. Evidently, the inessentials, of which Mr. Gloag says I have such a masterly grasp, have appealed to him as being worth while expanding upon after his own fashion. I am glad, for probably no one is better qualified than he to say just what propaganda could, or could not, do for architecture. More power to his elbow!

JOHN MICHAEL

### Community Centres

SIR,—In continuation of my letter published in your issue for February 4, on the need for providing Community Centres on Housing Estates, may I call attention to the Village College established at Sawston in 1930 by the Cambridgeshire Education Committee?



This scheme represents an attempt to concentrate in one building not only the educational but also the recreational and social activities of a group of nine villages situated within a radius of about five miles. It has as its basis a central senior school, and a very successful programme of evening activities is in operation.

In addition to classrooms, the premises consist of a large hall, which is used extensively for different social functions; a room especially equipped for adult education courses and lectures; an agricultural education room; and a library and reading room.

This important experiment of an enlightened County Council marks the opening of a new and significant phase in English rural education, but no one will deny the wisdom and logic of providing on a comprehensive scale for the physical, mental and social needs of the working-class population. The Sawston scheme is certainly a model for other rural areas in Great Britain.

H. L. NATHAN

## LAW REPORTS

### CLAIM FOR ARCHITECT'S FEES

*Benjamin v. Bardiger.—King's Bench Division.  
Before Mr. Justice Goddard.*

THIS was an action by Mr. Ashley Florian Benjamin, of Southwick Place, London, W., against Mr. Solomon Bardiger, of Brick Lane, Bethnal Green, to recover £345 in respect of professional services alleged to have been rendered by him as an architect.

The claim arose out of a project for the development of property in North Place, E.

It was stated that Mr. Bardiger was desirous of demolishing the existing buildings and erecting a block of flatlets on the site, and that he entered into an arrangement with Mr. Benjamin, who was to act as his architect. It was alleged that Mr. Benjamin prepared plans and specifications and, among other things, interviewed the district surveyor and London County Council officials, and invited tenders from builders.

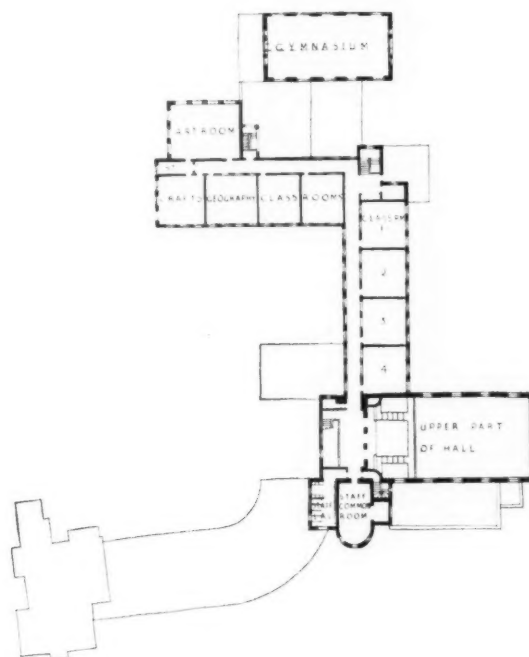
Mr. Benjamin contended that he was to be paid for his work at the rate of 5 per cent. on the lowest tender obtained. The £345 claimed was two-thirds of this 5 per cent., the lowest tender received being £10,360.

Mr. Bardiger, in his defence to the claim, pleaded that he had an oral agreement with Mr. Benjamin by which the latter was to receive his 5 per cent. on the builder's contract price in instalments as certificates were issued by him to the builder. As no building operations had yet been put in hand on the site, no certificates had been issued, and Mr. Bardiger's contention was that Mr. Benjamin was not yet entitled to payment.

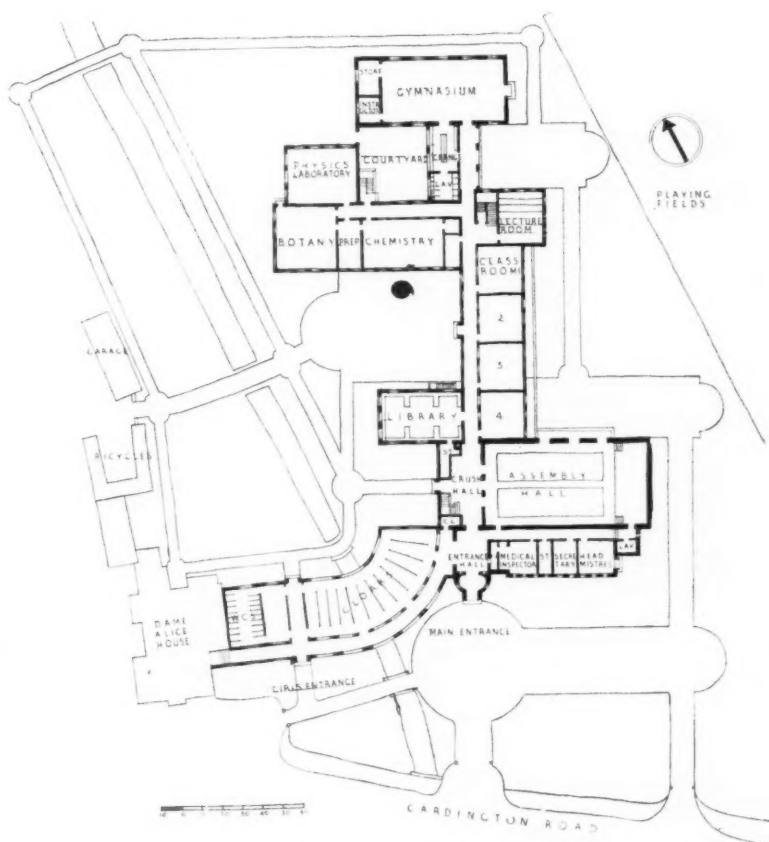
Mr. Bardiger added that he had been unable to obtain possession of the premises to carry out the development project owing to the fact that certain of the tenants now in occupation were entitled to the protection of the Rent Restriction Acts.

Mr. Ashe Lincoln, Counsel for Mr. Bardiger, submitted that what had happened was that Mr. Benjamin entered into a

## GIRLS' MODERN SCHOOL, BEDFORD



FIRST FLOOR PLAN



GROUND FLOOR PLAN

Ground and first floor plans of the Girls' Modern School, Bedford. Architect, Oswald P. Milne.

bargain to do certain work knowing that the bargain was subject to the risk of it not being possible to get some of the present tenants out of the premises.

His lordship, after hearing evidence, gave judgment. He said he could not accept the contention that Mr. Benjamin had agreed that he should receive his remuneration as and when the work of putting up the projected new building proceeded. It had been contended on behalf of Mr. Bardiger that the arrangement was that Mr. Benjamin should be paid 5 per cent. of the value of each certificate he issued so that his remuneration would be spread over the whole period that the building work was in progress. He did not think that any agreement of that sort had been proved. Mr. Bardiger was a business man and a speculative dealer in properties, and if there was such an agreement it was the sort of thing one would have expected him to have had put in writing. There was, however, nothing in writing.

His lordship said he was satisfied that such an agreement was not made, and he was clearly of the opinion that Mr. Benjamin was entitled to recover the amount he claimed. It seemed in the circumstances that two-thirds of the 5 per cent. of the builder's contract price was a reasonable sum for Mr. Benjamin to claim in respect of the work which he had already done.

Judgment was accordingly entered against Mr. Bardiger for £345, with costs.

#### FAULTY LADDER—LIABILITY

*Woodman v. Richardson and another.—King's Bench Division. Before Mr. Justice Branson.*

THIS was an action by Mr. Richard Charles Woodman to recover damages for personal injuries sustained by him owing to the alleged negligence and/or breach of duty of one or the other or both of the defendants, Mr. L. F. Richardson, a builder and contractor, of Mount Ephraim Road, Streatham, and Concrete, Ltd., of Grand Buildings, Trafalgar Square.

Plaintiff is a general labourer, and in September, 1935, he was employed by Concrete, Ltd., at the new theatre in London Road, West Croydon, on certain work in connection with which Mr. Richardson was the head contractor, and Concrete, Ltd., the sub-contractors. By the contract Mr. Richardson supplied all the plant to be used on the work, including ladders to be used by Concrete, Ltd., and their employees. Whilst so employed on September 25, the plaintiff was descending a ladder when he lost his footing by reason of the fact that rungs were missing from the ladder, and as a result his case was that he suffered injury to his left knee causing synovitis and swelling and aggravation of pre-existing arthritis, bruising and shock. He claimed damages for these injuries, and alleged that they were due to the defective condition of the ladder, that condition being due to the negligence or breach of statutory duty of both defendants. Plaintiff said he had never been warned as to the state of the ladder, and that the defendants had failed properly to fix the ladder so that it could not move. The statutory duty upon which the plaintiff relied was that imposed by Regulation 29 of the Building Regulations, 1926.

Mr. Richardson, by his defence, pleaded that the plaintiff had been guilty of contributory negligence in walking upon the ladder when he knew, or could by reasonable care and observation have seen, if such was the case that there were missing

or defective rungs. Mr. Richardson also pleaded a denial of negligence or breach of statutory duty.

Concrete, Ltd., alleged that the plaintiff had been guilty of contributory negligence, and denied that the premises where the accident happened were at the material time premises to which the Building Regulations applied. They further denied that the ladder was ever their property or provided by them, or that they had been guilty of any negligence or breach of statutory duty at all. They admitted that if the Regulations applied to the premises, Mr. Richardson was guilty of a breach of a statutory duty in that he had failed to observe the regulations in respect of the ladder.

Mr. F. A. Sellers, K.C., and Mr. James Macmillan appeared for the plaintiff, Mr. C. Gallop for Mr. Richardson, and Mr. Humphrey Edmunds for Concrete, Ltd.

His lordship found negligence established against Mr. Richardson and not against Concrete, Ltd. He held that there had been no breach of statutory duty on the part of Concrete, Ltd. As he held there was no negligence on the part of the plaintiff, he awarded him £160 as against the defendant Richardson. The claim against Concrete, Ltd., he dismissed, and ordered their costs to be paid by the defendant Richardson.

### R. I. B. A.



### COUNCIL MEETING

Following are some notes from a recent meeting of the Council of the Institute:—

*Election of Royal Gold Medallist 1937.* Sir Raymond Unwin (Past President) was formally elected as Royal Gold Medallist for 1937.

*University of London Architectural Education Committee: Appointment of R.I.B.A. Representatives.* Mr. T. A. Darcy Braddell (F) and Mr. Hubert Lidbetter (F) were re-nominated as the R.I.B.A. representatives on the Architectural Education Committee of the University of London.

*British Standards Institution.* In consequence of Mr. L. W. Thornton White's departure from England to take up his appointment as Professor of Architecture at the University of Capetown, the following appointments were made: *Building Divisional Council:* Mr. Walter Goodsmith (A). *Technical Committee B/25, Standard System of Colours for Conduits in Buildings:* Mr. Walter Goodsmith (A). *Technical Committee 18/3, High Tensile Structural Steel:* Mr. P. J. Waldram (L). Mr. Godfrey H. Samuel (A) was appointed to represent the R.I.B.A. on Technical Committee CH/16, Dustbins and Storage Containers.

*Joint Sub-Committee of the Science Standing Committee and the Board of Architectural Education on the suggested undergraduate training of architects in connection with air-raid precautions:* Mr. Thomas Wallis (F) was appointed to represent the Science Standing Committee in place of Mr. Thornton White.

*Public Relations Committee:* Mr. F. R. Taylor (L) was appointed as the representative of the Science Standing Committee on the Public Relations Committee in place of Mr. Thornton White.

*Proposed Joint Committee on Smoke Abatement:* Mr. P. J. Waldram (L) was appointed to represent the Institute on a proposed Joint Committee on Smoke Abatement.

*R.I.B.A. Architecture Bronze Medals: Leicester and Leicestershire Society of Architects:* Mr. T. C. Howitt (F) was appointed as the R.I.B.A. representative on the Jury for the award of the R.I.B.A. Architecture Bronze Medal in the area of the Leicester and Leicestershire Society of Architects.

*Conference to consider the possible institution of Courses of Instruction, Examinations and the Creation of a Diploma in Illuminating Engineering:* Mr. L. H. Bucknell (F) was appointed as the R.I.B.A. representative on the conference called by the National Illumination Committee of Great Britain to consider the possible institution of courses of instruction, examinations and the creation of a diploma in illuminating engineering.

*Royal Sanitary Institute Health Congress, Birmingham:* Mr. Alfred Hale (F), President of the Birmingham and Five Counties Architectural Association, was appointed as the R.I.B.A. delegate to the Health Congress of the Royal Sanitary Institute to be held at Birmingham from July 12 to 17, 1937.

*Annual Congress of the Royal Institute of Public Health and the Institute of Hygiene, Margate:* Mr. H. Anderson (F), Chairman of the Canterbury District Chapter of the South-Eastern Society of Architects, was appointed as the R.I.B.A. delegate to the Annual Congress of the Royal Institute of Public Health in conjunction with the Institute of Hygiene to be held at Margate from May 25 to 29, 1937.

*Junior Members' Committee:* Mr. John Summerson (A) was appointed as Chairman of the Junior Members' Committee in place of Mr. L. W. Thornton White.

*Salaried Members' Committee:* Mr. Roderick G. Fisher (A) was appointed as a member of the Salaried Members' Committee.

*The Placing of Sub-Contracts:* On the recommendation of the Practice Standing Committee it was decided to reprint the memorandum on the Placing of Sub-Contracts published in the *R.I.B.A. Journal* for January 23, 1937, as a separate leaflet and to issue a copy with every copy of the 1931 Form of Contract which is sold.

*Draft Agreement:* The revised draft Form of Agreement between a Local Authority and a Firm of Architects, prepared by the Practice Standing Committee in conjunction with the Institute Solicitor, was approved for substitution in place of the existing form.

*Proposed London County Council Bye-laws for the Use of Timber in the Construction and Conversion of Buildings:* The Science Standing Committee reported that a memorandum of objections to the proposed Bye-laws for the use of Timber had been prepared by a special sub-committee set up for the purpose, and submitted to a joint committee of representatives of the R.I.B.A., the Chartered Surveyors' Institution, the Institution of Civil Engineers and the Institution of Structural Engineers. It was reported that the Joint Committee had agreed upon a letter embodying a number of objections, to be sent to the Minister of Health by each of the four bodies. The letter had accordingly been signed by the

Secretary R.I.B.A. and sent to the Minister by the stipulated date.

It was further reported that the Joint Committee had since met representatives of the London County Council in order to discuss the objections submitted.

*The British Waterworks Association: Standing Committee on Water Regulations:* It was reported to the Council that the work of the Standing Committee on Water Regulations was of little interest to architects and on the recommendation of the Science Standing Committee it was decided to withdraw the R.I.B.A. representative from this Committee.

*Amendment of the Articles of Association of the Manchester Society of Architects:* Amendments in the Articles of Association of the Manchester Society of Architects were formally approved.

*Reinstatements:* The following ex-members were reinstated: *As Associates:* Messrs. A. H. Elijah, B. J. Jessop, P. E. Palmer, H. A. Ross and H. B. Tunnard.

*Resignations:* The following resignations were accepted with regret: Messrs. E. Jones (F), H. C. Lander (F), T. T. G. Donaldson-Selby (L) and C. Mitchell (L).

*Transfers to the Retired Members Class:* The following members were transferred to the Retired Members Class: *As Retired Fellows:* Colonel Easton and Messrs. J. Berry, W. T. P. Bryce, and W. J. Waghorne. *As Retired Licentiates:* Miss F. F. Hobson and Mr. A. W. G. Prosser.

*Transfer to Associateship:* The following architect was transferred to the Associateship under the provisions of the Supplemental Charter of 1925: Mr. G. Newell (L).

#### R.I.B.A. DRAMATIC SOCIETY

The first lecture arranged for this year by the R.I.B.A. Dramatic Society will be given at the R.I.B.A. on Friday, March 19, at 8.30 by Mr. W. S. Kennedy, Chairman of the Incorporated Stage Society. Mr. Kennedy's subject will be "Illusion in the Theatre" and the lecture will be free to all who are interested.

## IN PARLIAMENT

[BY OUR SPECIAL REPRESENTATIVE]

The Architects' Registration Bill has been read a third time in the House of Lords.

#### Reynolds' House, Leicester Square

Mr. Bossom asked the Minister of Health if, seeing that the destruction of Reynolds' house, in Leicester Square, was imminent, he would approach the town planning authority responsible, and use every endeavour to prevent this historic landmark being eliminated.

Sir Kingsley Wood said that it was for the local authority to determine whether they would make an Order under Section 17 of the Town and Country Planning Act, 1932, but he would send a copy of the question and reply to the local authority.

#### Crystal Palace

Sir Percy Harris asked the Prime Minister whether the Government had given any consideration to the future of the Crystal Palace site; and whether, considering that the Palace was a great national institution, he would take steps to secure that the site was utilized to promote the health and recreation of the people.

Mr. Baldwin said that as regarded the first part of the question, this was primarily

a matter for the trustees under the Crystal Palace Act, 1914: as to the second part of the question, if the trustees had any proposals to make with this end in view they would no doubt in due course lay them before the National Advisory Council for Physical Training and Recreation.

## Manufacturers' Items

Messrs. Nobles and Hoare, manufacturers of paints and varnishes for over one hundred and fifty years, have appointed a new chairman, and are now in process of reorganizing and modernizing the company. We are informed by Mr. E. N. Deane, the managing director, that one of the first steps in the reorganization scheme was made at the Sales Conference held in December. At that conference the representatives were encouraged to put forward the desires and viewpoints of their customers. These were studied and, as far as possible, adopted. "It has," he states, "now become an integral part of the sales policy of the company to assist the decorator to secure more profitable business. Architects have now available a more practical service from a department staffed with practical, experienced architects. The range of

colours this year has been selected on a very scientific basis. A study of the trend of colours was made. As a result of this analysis the firm's colour range for decorative purposes is definitely related to the colour-schemes which confidently can be expected to be most in demand. This entailed a research for the purpose of discovering what the manufacturers of decorative material, such as carpets, curtains and furniture coverings, were producing. With the aid of the experts of the British Colour Council we were able to produce a range of colours which can be used harmoniously with these materials."

Mr. Ashley S. Ward, and Mr. Joshua Vickers have been appointed directors of the Widnes Foundry and Engineering Co., Ltd., Widnes. The former is the joint managing director of Thos. W. Ward, Ltd., and holds directorships in Marshall's, Gainsborough, Laycocks, Sheffield, and other companies.

We regret that the name of the J. B. Gravity Ladder Co. was incorrectly spelt in our issue for February 18.

# THE WEEK'S BUILDING NEWS

## LONDON & DISTRICT (15 MILES RADIUS)

**BARKING.** *Layout of Park.* The Barking Corporation has approved a scheme by Mr. Mawson for the layout of Mayesbrook Park, at a cost of £45,688.

**CROYDON.** *Houses, etc.* Plans passed by the Croydon Corporation: 29 houses, Crossways, Addington, Addiscombe Garden Estates, Ltd.; 76 houses, British Garden Estates, Ltd.; flats, Purley Grange, Purley, Messrs. Davies and Knight; 14 houses, Devonshire Way, The Hunt Construction Co.

**CROYDON.** *Church, etc.* The Roman Catholic Diocese of Southwark is to erect a church, presbytery and parish hall in Violet Lane, South Croydon.

**CROYDON.** *Extensions.* The Croydon Corporation has approved plans for extensions at Warlingham mental hospital, at a cost of £219,257.

**CROYDON.** *Refuse Destructor.* The Croydon Corporation has prepared a scheme for refuse destructor works at a cost of £52,000.

**HAMPSTEAD GARDEN SUBURB.** *Extensions.* The Governing Body of the Hampstead Garden Suburb Henrietta Barnett school for girls is to enlarge the school at a cost of £23,000.

**ISLINGTON.** *Dwellings.* The Islington B.C. has approved plans by Mr. E. C. Monson, architect, for the erection of 225 dwellings, at Brecknock Road.

**LONDON.** *Rehousing, etc.* The L.C.C. is to clear an area at Albany Road, Camberwell, and provide rehousing at a cost of £13,500.

## EASTERN COUNTIES

**NORWICH.** *Schools.* The Norwich Education Committee is to erect a public elementary school for about 480 senior girls in the premises of the present Angel Road Council School, and a new elementary school for about 360 boys at the Earham North estate.

**SOUTHEND.** *School.* The Southend Education Committee is to erect a high school for boys, at a cost of £62,155.

## SOUTHERN COUNTIES

**KENT.** *Boiler House, etc.* The Kent C.C. is to provide a new boiler house and engineering services at the County Hospital, Dartford, at a cost of £26,605.

**KENT.** *Extensions.* The Kent C.C. is to enlarge the Lyminge institution, at a cost of £185,000.

**KENT.** *Extensions.* The Kent C.C. is to erect a maternity and children's unit at the county Hospital, Farnborough, at a cost of £59,285.

## MIDLAND COUNTIES

**CHESHIRE.** *Cinema, etc.* The New Curzon Land and Development Co., Ltd., is to erect a cinema, café and shops in Gatley Road, Gatley, Cheshire.

**CHESHIRE.** *New Offices.* The Cheshire C.C. has approved plans for the provision of new offices, including heating, lighting, engineering work, road paving and public paths, boundary walls, gates and cycle storage, at a cost of £168,975.

**CHESHIRE.** *Extension.* The James Mills, Ltd., are to extend their factory in Lower Bents Lane, Bredbury, Cheshire.

**CHESHIRE.** *Welfare Centre.* The Cheshire C.C. has asked the county architect to prepare plans for the erection of a welfare centre at Bollington.

**CHESHIRE.** *Extensions.* The Cheshire C.C. has prepared a scheme for extensions at Clatterbridge hospital, at a cost of £148,050.

## NORTHERN COUNTIES

**CLIFTON.** *School.* The North Riding Local Education Committee is to provide a new public elementary school in the parish of Clifton, for about 300 juniors.

**HULL.** *Houses.* The Hull Corporation is to erect 86 houses on the Endike Lane estate.

**LANCASHIRE.** *School.* The Lancashire Education Committee is to erect a senior school at Blackrod, at a cost of £18,812.

**LANCASHIRE.** *School.* The Lancashire Education Committee is to erect a senior school at Formby, at a cost of £16,258.

**MANCHESTER.** *Welfare Centre and School Clinic.* The Manchester Education Committee has approved plans of the proposed combined child welfare centre and school clinic to be erected on the site of Sharston school, Wythenshawe.

**MORECAMBE.** *Extensions, etc.* Plans passed by the Corporation: Extensions, Euston Road, for the Public Benefit Boot Co.; four houses, Schola Green Lane, for Messrs. Fisher and Webster; five houses, Chatsworth Road and Ellesmere Road, for New Morecambe Land Co.; bus shelter, Morecambe Road, for Morecambe and Heysham Corporation Transport Department; 12 houses, Hestham Hill, for Messrs. G. Clarke, Ltd.; addition, Euston Road, for Mr. R. Gardner; flats, Crimewell Lane, for Mr. A. Hodgkinson.

**SHEFFIELD.** *Wash-house.* The Sheffield Corporation has accepted the tender of Messrs. J. Middleton, Ltd., (£14,965), for the erection of a public wash-house in Rutland Street, Woodside.



# RATES OF WAGES

The initial letter opposite every entry indicates the grade under the Ministry of Labour schedule. The district is that to which the borough is assigned in the same schedule. Column I gives the rates for craftsmen; Column II for

labourers. The rate for craftsmen working at trades in which a separate rate maintains is given in a footnote. The table is a selection only. Particulars for lesser localities not included may be obtained upon application in writing.

		I.	II.			I.	II.			I.	II.
<b>A</b>	<b>ABERDARE</b> ... S. Wales & M.	1 7	1 2	<b>A</b>	<b>EASTBOURNE</b> ... S. Counties	1 6	1 1	<b>A</b>	<b>Northampton</b> ... Mid. Counties	1 7	1 2
<b>A</b>	<b>Aberdeen</b> ... Scotland	1 7	1 2	<b>A</b>	<b>Ebbw Vale</b> ... S. Wales & M.	1 6	1 1	<b>A</b>	<b>North Shields</b> ... N.E. Coast	1 7	1 2
<b>A</b>	<b>Abergavenny</b> ... S. Wales & M.	1 6	1 1	<b>A</b>	<b>Edinburgh</b> ... Scotland	1 7	1 2	<b>A</b>	<b>North Staffs</b> ... Mid. Counties	1 7	1 2
<b>A</b>	<b>Abingdon</b> ... S. Counties	1 6	1 1	<b>B</b>	<b>Exeter</b> ... S.W. Counties	1 6	1 1	<b>A</b>	<b>Norwich</b> ... E. Counties	1 6	1 1
<b>A</b>	<b>Accrington</b> ... N.W. Counties	1 7	1 2	<b>B</b>	<b>Exmouth</b> ... S.W. Counties	1 5	1 0	<b>A</b>	<b>Nottingham</b> ... Mid. Counties	1 7	1 2
<b>A</b>	<b>Addlestone</b> ... S. Counties	1 6	1 1	<b>A</b>	<b>FELIXSTOWE</b> ... E. Counties	1 5	1 1	<b>A</b>	<b>Newton</b> ... Mid. Counties	1 7	1 2
<b>A</b>	<b>Adlington</b> ... N.W. Counties	1 7	1 2	<b>A</b>	<b>Filey</b> ... Yorkshire	1 5	1 1	<b>A</b>	<b>Oldham</b> ... Mid. Counties	1 5	1 1
<b>A</b>	<b>Airdrie</b> ... Scotland	1 7	1 2	<b>A</b>	<b>Fleetwood</b> ... N.W. Counties	1 7	1 2	<b>A</b>	<b>Oldham</b> ... N.W. Counties	1 5	1 1
<b>C</b>	<b>Aldeburgh</b> ... E. Counties	1 3	1 1	<b>B</b>	<b>Folkestone</b> ... S. Counties	1 4	1 0	<b>A</b>	<b>Oswestry</b> ... N.W. Counties	1 5	1 1
<b>A</b>	<b>Altrincham</b> ... N.W. Counties	1 7	1 2	<b>B</b>	<b>Frodingham</b> ... N.W. Counties	1 7	1 2	<b>A</b>	<b>Oxford</b> ... S. Counties	1 6	1 1
<b>B</b>	<b>Ashton-under-Lyne</b> ... N.W. Counties	1 7	1 2	<b>B</b>	<b>Frome</b> ... S.W. Counties	1 4	1 0				
<b>B</b>	<b>Aylesbury</b> ... S. Counties	1 5	1 0	<b>A</b>	<b>GATESHEAD</b> ... N.E. Coast	1 7	1 2	<b>A</b>	<b>PAISLEY</b> ... Scotland	1 7	1 2
<b>B</b>	<b>BANBURY</b> ... S. Counties	1 5	1 0	<b>A</b>	<b>Gillingham</b> ... S. Counties	1 5	1 0	<b>B</b>	<b>Pembroke</b> ... S. Wales & M.	1 3	0 11
<b>B</b>	<b>Bangor</b> ... N.W. Counties	1 4	1 0	<b>A</b>	<b>Glamorgan-shire, Rhondda Valley District</b>	1 6	1 1	<b>A</b>	<b>Perth</b> ... Scotland	1 3	0 11
<b>B</b>	<b>Barnard Castle</b> ... N.E. Coast	1 5	1 1	<b>A</b>	<b>Glasgow</b> ... Scotland	1 7	1 2	<b>A</b>	<b>Peterborough</b> ... E. Counties	1 6	1 1
<b>A</b>	<b>Barnsley</b> ... Yorkshire	1 7	1 2	<b>A</b>	<b>Gloucester</b> ... S.W. Counties	1 6	1 1	<b>A</b>	<b>Pontefract</b> ... S.W. Counties	1 7	1 2
<b>A</b>	<b>Barrow</b> ... S.W. Counties	1 5	1 0	<b>A</b>	<b>Goole</b> ... Yorkshire	1 6	1 1	<b>A</b>	<b>Pontypridd</b> ... Yorkshire	1 7	1 2
<b>A</b>	<b>Barry</b> ... N.W. Counties	1 7	1 2	<b>A</b>	<b>Gosport</b> ... S. Counties	1 6	1 1	<b>A</b>	<b>Pontypridd</b> ... S. Wales & M.	1 6	1 1
<b>B</b>	<b>Basinstoke</b> ... S.W. Counties	1 7	1 2	<b>A</b>	<b>Grantham</b> ... Mid. Counties	1 5	1 1	<b>A</b>	<b>Preston</b> ... N.W. Counties	1 7	1 2
<b>A</b>	<b>Bath</b> ... S.W. Counties	1 5	1 0	<b>A</b>	<b>Gravesend</b> ... S. Counties	1 6	1 1				
<b>A</b>	<b>Batley</b> ... Yorkshire	1 7	1 2	<b>A</b>	<b>Greenock</b> ... S. Counties	1 6	1 1				
<b>A</b>	<b>Bedford</b> ... E. Counties	1 6	1 1	<b>A</b>	<b>Grimby</b> ... Mid. Counties	1 7	1 2				
<b>A</b>	<b>Berwick-on-Tweed</b> ... N.E. Coast	1 6	1 1	<b>B</b>	<b>Guildford</b> ... S. Counties	1 5	1 0				
<b>A</b>	<b>Bewdley</b> ... Mid. Counties	1 6	1 1	<b>A</b>	<b>HALIFAX</b> ... Yorkshire	1 7	1 2	<b>A</b>	<b>READING</b> ... S. Counties	1 6	1 1
<b>B</b>	<b>Bicester</b> ... S. Counties	1 5	1 0	<b>A</b>	<b>Hanley</b> ... Mid. Counties	1 7	1 2	<b>B</b>	<b>Reigate</b> ... S. Counties	1 8	1 1
<b>A</b>	<b>Birkenhead</b> ... N.W. Counties	1 7	1 2	<b>A</b>	<b>Harrogate</b> ... Yorkshire	1 7	1 2	<b>A</b>	<b>Retford</b> ... Mid. Counties	1 8	1 1
<b>A</b>	<b>Birmingham</b> ... Mid. Counties	1 7	1 2	<b>A</b>	<b>Hartlepool</b> ... N.E. Coast	1 7	1 2	<b>A</b>	<b>Rhondda Valley</b> ... S. Wales & M.	1 5	1 0
<b>A</b>	<b>Biabop Auckland</b> ... N.E. Coast	1 6	1 1	<b>B</b>	<b>Hastings</b> ... S. Counties	1 5	1 0	<b>A</b>	<b>Ripon</b> ... Yorkshire	1 6	1 1
<b>A</b>	<b>Blackburn</b> ... N.W. Counties	1 7	1 2	<b>A</b>	<b>Hatfield</b> ... S. Counties	1 6	1 1	<b>B</b>	<b>Rochdale</b> ... N.W. Counties	1 7	1 2
<b>A</b>	<b>Blackpool</b> ... N.W. Counties	1 7	1 2	<b>A</b>	<b>Hereford</b> ... S.W. Counties	1 5	1 0	<b>B</b>	<b>Rochester</b> ... S. Counties	1 5	1 0
<b>A</b>	<b>Blackthorn</b> ... N.E. Coast	1 7	1 2	<b>A</b>	<b>Heworth</b> ... E. Counties	1 6	1 1	<b>A</b>	<b>Rugby</b> ... N.W. Counties	1 6	1 1
<b>A</b>	<b>Blyth</b> ... S.W. Counties	1 7	1 2	<b>A</b>	<b>Heysham</b> ... N.W. Counties	1 7	1 2	<b>A</b>	<b>Rugby</b> ... Mid. Counties	1 6	1 1
<b>B</b>	<b>Bognor</b> ... S. Counties	1 5	1 0	<b>A</b>	<b>Howden</b> ... N.E. Coast	1 7	1 2	<b>A</b>	<b>Runcorn</b> ... N.W. Counties	1 7	1 2
<b>A</b>	<b>Bolton</b> ... N.W. Counties	1 7	1 2	<b>A</b>	<b>Huddersfield</b> ... Yorkshire	1 7	1 2				
<b>A</b>	<b>Boston</b> ... Mid. Counties	1 7	1 2	<b>A</b>	<b>Hull</b> ... Yorkshire	1 7	1 2	<b>A</b>	<b>ST ALBANS</b> ... E. Counties	1 6	1 1
<b>A</b>	<b>Bournemouth</b> ... S. Counties	1 5	1 0	<b>A</b>	<b>Immingham</b> ... Mid. Counties	1 7	1 2	<b>B</b>	<b>St. Helens</b> ... N.W. Counties	1 7	1 2
<b>B</b>	<b>Bovey Tracey</b> ... S.W. Counties	1 4	1 0	<b>A</b>	<b>Ipswich</b> ... E. Counties	1 6	1 1	<b>B</b>	<b>Salisbury</b> ... S.W. Counties	1 3	0 11
<b>A</b>	<b>Bradford</b> ... Yorkshire	1 7	1 2	<b>B</b>	<b>Isle of Wight</b> ... S. Counties	1 4	1 0	<b>A</b>	<b>Scarborough</b> ... Yorkshire	1 6	1 1
<b>A</b>	<b>Bradwell</b> ... E. Counties	1 6	1 1	<b>A</b>	<b>LELEY</b> ... Yorkshire	1 7	1 2	<b>A</b>	<b>Seaford</b> ... Mid. Counties	1 7	1 2
<b>A</b>	<b>Brighthelm</b> ... S. Wales & M.	1 7	1 2	<b>A</b>	<b>Immingham</b> ... Mid. Counties	1 7	1 2	<b>A</b>	<b>Sheffield</b> ... Yorkshire	1 7	1 2
<b>A</b>	<b>Bridgwater</b> ... S.W. Counties	1 5	1 0	<b>B</b>	<b>Isle of Wight</b> ... S. Counties	1 4	1 0	<b>A</b>	<b>Shipley</b> ... Yorkshire	1 7	1 2
<b>A</b>	<b>Bridlington</b> ... Yorkshire	1 6	1 1	<b>A</b>	<b>JARROW</b> ... N.E. Coast	1 7	1 2	<b>A</b>	<b>Shrewsbury</b> ... Mid. Counties	1 6	1 1
<b>A</b>	<b>Brighouse</b> ... Yorkshire	1 6	1 1	<b>A</b>	<b>KENILWORTH</b> ... Yorkshire	1 7	1 2	<b>A</b>	<b>Skipton</b> ... Yorkshire	1 6	1 1
<b>A</b>	<b>Brighton</b> ... S. Counties	1 6	1 1	<b>A</b>	<b>Kendal</b> ... N.W. Counties	1 5	1 0	<b>A</b>	<b>Slough</b> ... S. Counties	1 6	1 1
<b>A</b>	<b>Bristol</b> ... S.W. Counties	1 7	1 2	<b>A</b>	<b>Keswick</b> ... N.W. Counties	1 5	1 0	<b>A</b>	<b>Southampton</b> ... Mid. Counties	1 6	1 1
<b>A</b>	<b>Brixham</b> ... S.W. Counties	1 5	1 0	<b>A</b>	<b>Kettering</b> ... Mid. Counties	1 6	1 1	<b>A</b>	<b>Southend-on-Sea</b> ... E. Counties	1 6	1 1
<b>A</b>	<b>Bromsgrove</b> ... Mid. Counties	1 7	1 2	<b>A</b>	<b>Kidderminster</b> ... Mid. Counties	1 6	1 1	<b>A</b>	<b>Stafford</b> ... N.W. Counties	1 7	1 2
<b>A</b>	<b>Bromyard</b> ... N.W. Counties	1 5	1 0	<b>A</b>	<b>King's Lynn</b> ... E. Counties	1 4	1 0	<b>A</b>	<b>Stafford</b> ... N.E. Coast	1 7	1 2
<b>A</b>	<b>Burslem</b> ... Mid. Counties	1 7	1 2	<b>A</b>	<b>LANCASTER</b> ... N.W. Counties	1 7	1 2	<b>A</b>	<b>Stirling</b> ... Scotland	1 7	1 2
<b>A</b>	<b>Burton-on-Trent</b> ... Mid. Counties	1 7	1 2	<b>A</b>	<b>Leamington</b> ... Mid. Counties	1 6	1 1	<b>A</b>	<b>Stockport</b> ... N.W. Counties	1 7	1 2
<b>A</b>	<b>Bury</b> ... N.W. Counties	1 7	1 2	<b>A</b>	<b>Leeds</b> ... Yorkshire	1 7	1 2	<b>A</b>	<b>Stockport-on-Tees</b> ... N.E. Coast	1 7	1 2
<b>A</b>	<b>Buxton</b> ... N.W. Counties	1 6	1 1	<b>A</b>	<b>Leek</b> ... Mid. Counties	1 7	1 2	<b>A</b>	<b>Stoke-on-Trent</b> ... Mid. Counties	1 7	1 2
<b>A</b>	<b>CAMBRIDGE</b> ... E. Counties	1 6	1 1	<b>A</b>	<b>Leicester</b> ... Mid. Counties	1 7	1 2	<b>B</b>	<b>Stroud</b> ... S.W. Counties	1 5	1 0
<b>B</b>	<b>Canterbury</b> ... S. Counties	1 7	1 2	<b>A</b>	<b>Leigh</b> ... N.W. Counties	1 7	1 2	<b>A</b>	<b>Sunderland</b> ... N.E. Coast	1 7	1 2
<b>A</b>	<b>Cardiff</b> ... S. Wales & M.	1 5	1 0	<b>A</b>	<b>Lewes</b> ... S. Counties	1 5	1 0	<b>A</b>	<b>Swansea</b> ... S. Wales & M.	1 7	1 2
<b>A</b>	<b>Carlisle</b> ... N.W. Counties	1 7	1 2	<b>A</b>	<b>Lichfield</b> ... Mid. Counties	1 6	1 1	<b>A</b>	<b>Swindon</b> ... S.W. Counties	1 5	1 0
<b>B</b>	<b>Carmarthen</b> ... S. Wales & M.	1 5	1 0	<b>A</b>	<b>Lincoln</b> ... Mid. Counties	1 6	1 1	<b>A</b>	<b>TAMWORTH</b> ... N.W. Counties	1 6	1 1
<b>B</b>	<b>Carnarvon</b> ... N.W. Counties	1 5	1 0	<b>A</b>	<b>Liverpool</b> ... N.W. Counties	1 7	1 2	<b>B</b>	<b>Taunton</b> ... S.W. Counties	1 5	1 0
<b>A</b>	<b>Cardiff</b> ... N.W. Counties	1 7	1 2	<b>A</b>	<b>Llandudno</b> ... N.W. Counties	1 6	1 1	<b>A</b>	<b>Teeside Dist.</b> ... N.E. Counties	1 7	1 2
<b>A</b>	<b>Castleford</b> ... Yorkshire	1 7	1 2	<b>A</b>	<b>Llanelli</b> ... S. Wales & M.	1 7	1 2	<b>A</b>	<b>Teignmouth</b> ... S.W. Coast	1 7	1 2
<b>A</b>	<b>Chatham</b> ... S. Counties	1 7	1 2	<b>A</b>	<b>London (12-15 miles radius)</b>	1 8	1 3	<b>A</b>	<b>Todmorden</b> ... Yorkshire	1 7	1 2
<b>A</b>	<b>Chelmsford</b> ... E. Counties	1 5	1 0	<b>A</b>	<b>Long Eaton</b> ... Mid. Counties	1 7	1 2	<b>A</b>	<b>Torquay</b> ... S.W. Counties	1 6	1 1
<b>A</b>	<b>Cheltenham</b> ... S.W. Counties	1 5	1 0	<b>A</b>	<b>Loughborough</b> ... Mid. Counties	1 7	1 2	<b>B</b>	<b>Truro</b> ... S.W. Counties	1 4	1 0
<b>A</b>	<b>Chesham</b> ... N.W. Counties	1 7	1 2	<b>A</b>	<b>Luton</b> ... E. Counties	1 6	1 1	<b>A</b>	<b>Tunbridge Wells</b> ... S. Counties	1 5	1 0
<b>A</b>	<b>Chichester</b> ... S. Counties	1 7	1 2	<b>A</b>	<b>Lytham</b> ... N.W. Counties	1 7	1 2	<b>A</b>	<b>Tunstall</b> ... Mid. Counties	1 7	1 2
<b>B</b>	<b>Chorley</b> ... N.W. Counties	1 5	1 0	<b>A</b>	<b>Macclesfield</b> ... N.W. Counties	1 6	1 1	<b>A</b>	<b>Tyne District</b> ... N.E. Coast	1 7	1 2
<b>B</b>	<b>Cirencester</b> ... S. Counties	1 7	1 2	<b>A</b>	<b>Malderston</b> ... S. Counties	1 5	1 0	<b>A</b>	<b>WAKEFIELD</b> ... Yorkshire	1 7	1 2
<b>A</b>	<b>Clietheroe</b> ... N.W. Counties	1 4	1 0	<b>A</b>	<b>Malvern</b> ... Mid. Counties	1 5	1 0	<b>A</b>	<b>Walsall</b> ... Mid. Counties	1 7	1 2
<b>A</b>	<b>Clydebank</b> ... Scotland	1 7	1 2	<b>A</b>	<b>Manchester</b> ... N.W. Counties	1 7	1 2	<b>A</b>	<b>Warrington</b> ... N.W. Counties	1 7	1 2
<b>A</b>	<b>Coalville</b> ... Mid. Counties	1 7	1 2	<b>A</b>	<b>Mansfield</b> ... Mid. Counties	1 7	1 2	<b>A</b>	<b>Warwick</b> ... Mid. Counties	1 6	1 1
<b>A</b>	<b>Colchester</b> ... E. Counties	1 6	1 1	<b>B</b>	<b>Margate</b> ... S. Counties	1 4	1 0	<b>A</b>	<b>Wellington</b> ... Mid. Counties	1 6	1 1
<b>A</b>	<b>Colne</b> ... N.W. Counties	1 6	1 1	<b>A</b>	<b>Martock</b> ... Mid. Counties	1 5	1 0	<b>A</b>	<b>West Bromwich</b> ... Mid. Counties	1 7	1 2
<b>A</b>	<b>Colwyn Bay</b> ... N.W. Counties	1 6	1 1	<b>A</b>	<b>Middlesbrough</b> ... S. Wales & M.	1 6	1 1	<b>A</b>	<b>Weston-s-Mare</b> ... W. Counties	1 7	1 2
<b>A</b>	<b>Consett</b> ... N.W. Counties	1 6	1 1	<b>A</b>	<b>Middlewich</b> ... N.W. Counties	1 6	1 1	<b>A</b>	<b>Whitby</b> ... Yorkshire	1 6	1 1
<b>A</b>	<b>Conway</b> ... N.W. Counties	1 6	1 1	<b>B</b>	<b>Minehead</b> ... S.W. Counties	1 4	1 0	<b>A</b>	<b>Widnes</b> ... N.W. Counties	1 7	1 2
<b>A</b>	<b>Coventry</b> ... Mid. Counties	1 7	1 2	<b>B</b>	<b>Monmouth</b> ... S. Wales & M.	1 4	1 0	<b>A</b>	<b>Wigan</b> ... N.W. Counties	1 7	1 2
<b>A</b>	<b>Crewe</b> ... N.W. Counties	1 6	1 1	<b>A</b>	<b>Morecambe</b> ... N.W. Counties	1 7	1 2	<b>A</b>	<b>Winchester</b> ... S. Counties	1 5	1 0
<b>A</b>	<b>Cumberland</b> ... N.W. Counties	1 6	1 1	<b>A</b>	<b>NANTWICH</b> ... N.W. Counties	1 6	1 1	<b>A</b>	<b>Windsor</b> ... S. Counties	1 6	1 1
<b>A</b>	<b>DARLINGTON</b> ... N.E. Coast	1 7	1 2	<b>A</b>	<b>Neath</b> ... S. Wales & M.	1 6	1 1	<b>A</b>	<b>Wolverhampton</b> ... Mid. Counties	1 7	1 2
<b>A</b>	<b>Darwen</b> ... N.W. Counties	1 7	1 2	<b>A</b>	<b>Nelson</b> ... N.W. Counties	1 7	1 2	<b>A</b>	<b>Worke</b> ... Yorkshire	1 6	1 1
<b>B</b>	<b>Deal</b> ... S. Counties	1 4	1 0	<b>A</b>	<b>Newcastle</b> ... N.E. Coast	1 7	1 2	<b>A</b>	<b>Wrexham</b> ... N.W. Counties	1 5	1 0
<b>A</b>	<b>Denbigh</b> ... N.W. Counties	1 4	1 0	<b>A</b>	<b>Newport</b> ... S. Wales & M.	1 7	1 2	<b>A</b>	<b>Wycombe</b> ... S. Counties	1 6	1 1
<b>A</b>	<b>Derby</b> ... Mid. Counties	1 7	1 2	<b>A</b>	<b>Normanton</b> ... Yorkshire	1 7	1 2	<b>B</b>	<b>YARMOUTH</b> ... E. Counties	1 5	1 0
<b>A</b>	<b>Dewsbury</b> ... Yorkshire	1 7	1 2					<b>B</b>	<b>Yeovil</b> ... S.W. Counties	1 5	1 0
<b>B</b>	<b>Didcot</b> ... S. Counties	1 5	1 0					<b>A</b>	<b>York</b> ... Yorkshire	1 7	1 2
<b>B</b>	<b>Doncaster</b> ... Yorkshire	1 7	1 2								
<b>B</b>	<b>Dorchester</b> ... S.W. Counties	1 7	1 2								
<b>A</b>	<b>Driffield</b> ... Yorkshire	1 5	1 0								
<b>A</b>	<b>Droitwich</b> ... Mid. Counties	1 5	1 0								
<b>A</b>	<b>Dudley</b> ... Mid. Counties	1 7	1 2								
<b>A</b>	<b>Dumfries</b> ... Scotland	1 6	1 1								
<b>A</b>	<b>Dundee</b> ... Scotland	1 7	1 2								
<b>A</b>	<b>Durham</b> ... N.E. Coast	1 7	1 2								

\* In these areas the rates of wages for certain trades (usually painters and plasterers) vary slightly from those given. The rates for every trade in any given area will be sent on request. The rates of wages have been revised consequent upon the increase in wages which came into operation on February 1, together with all revisions following authorized annual readjustments.



## CURRENT PRICES

The wages are the standard Union rates of wages payable in London at the time of publication. The prices given below are for materials of good quality and include delivery to site in Central London area, unless otherwise stated. For delivery outside this area, adjust-

ment should be made for the cost of transport. Though every care has been taken in its compilation, it is impossible to guarantee the accuracy of the list, and readers are advised to have the figures confirmed by trade inquiry. The whole of the information given is copyright.

## WAGES

	per hour	s. d.
Bricklayer	1 8	8
Carpenter	1 8	8
Joiner	1 8	8
Machinist	1 9	9
Mason (Banker)	1 9	9
(Fixer)	1 8	8
Plumber	1 8	8
Painter	1 7	7
Paperhanger	1 7	7
Glazier	1 8	8
Slater	1 8	8
Scaffolder	1 4	4
Timberman	1 4	4
Navvy	1 3	3
General Labourer	1 3	3
Lorryman	1 6	6
Crane Driver	1 7	7
Watchman	2 10	0

## MATERIALS

## EXCAVATOR AND CONCRETOR

	per ton	£ s. d.
Grey Stone Lime	1 18	6
Blue Lias Lime	2 5	0
Hydrated Lime	1 19	0
Portland Cement, in 4-ton lots (d/d site, including Paper Bags)	2 5	0
Rapid Hardening Cement, in 4-ton lots (d/d site, including Paper Bags)	8 0	0
White Portland Cement, in 1-ton lots	6 6	0
Thames Ballast	7 0	0
1" Crushed Ballast	7 6	0
Building Sand	8 6	0
Washed Sand	8 0	0
2" Broken Brick	10 3	0
Pan Breeze	6 6	0
Coke Breeze	8 9	0

## DRAINLAYER

## BEST STONEWARE DRAIN PIPES AND FITTINGS

	per F.R.	s. d.
Straight Pipes	0 9	1 1
Bends	3 6	5 3
Taper Bends	4 3	6 3
Rest Bends	3 6	5 3
Single Junctions	4 9	6 6
Double	4 9	6 6
Straight channels	1 6	2 6
1" Channel bends	2 9	4 0
Channel junctions	4 6	6 6
Channel tapers	2 9	4 0
Yard gullies	6 9	8 9
Interceptors	16 0	19 6
IRON DRAINS:		
Iron drain pipe	1 6	2 6
Bends	5 0	10 6
Inspection bends	9 0	15 0
Single junctions	8 9	18 0
Double junctions	13 6	30 0
Lead Wool	lb.	6
Gaskin	5	—

## BRICKLAYER

	per M.	£ s. d.
Flettons	2 12	0
Grooved do.	2 14	0
Phorpres bricks	2 15	0
Cellular bricks	2 15	0
Stocks, 1st quality	4 11	0
2nd	4 2	6
Blue Bricks, Pressed	8 14	0
Wirecuts	7 12	6
Brindles	7 0	0
Bullnose	9 0	0
Red Sand-faced Facings	6 18	6
Red Rubbers for Arches	12 0	0
Multicoloured Facings	7 10	0
Luton Facings	7 10	0
Phorpres White Facings	3 17	3
Rustic Facings	3 12	3
Midhurst White Facings	5 0	0
Glazed Bricks, Ivory, White or Salt glazed, 1st quality:		
Stretchers	21 0	0
Headers	20 10	0
Bullnose	27 10	0
Double Stretchers	29 10	0
Double Headers	26 10	0
Glazed Second Quality, Less Buffs and Creams, Add.	1 0	0
Other Colours	5 10	0
2" Breeze Partition Blocks	1 7	0
2 1/2" " " "	1 10	0
3" " " "	2 1	0
4" " " "	2 6	0

## MASON

	per F.C.	s. d.
The following d/d F.O.R. at Nine Elms:		
Portland stone, Whitbed	4 4	4
Basebed	4 7	4
Bath stone	2 10	0
York stone	6 6	0
Sawn templates	7 6	0
Paving, 2"	1 8	0
3"	2 6	0

## SLATER AND TILER

	per M.	£ s. d.
First quality Bangor or Portmadoc slates d/d F.O.R. London station:		
24" x 12" Duchesses	28 17	6
22" x 12" Marchionesses	24 10	0
20" x 10" Countesses	19 5	0
18" x 10" Viscountesses	15 10	0
18" x 9" Ladies	13 17	6
Westmorland green (random sizes)	8 10	0
Old Delabole slates d/d in full truck loads to Nine Elms Station:		
20" x 10" medium grey per 1,000 (actual)	21 11	6
" " green	24 7	4
Best machine roofing tiles	4 5	0
Best hand-made do.	4 17	6
Hips and valleys	9	0
hand-made	9	0
Nails, compo	1 4	0
copper	1 6	0

## CARPENTER AND JOINER

	per F.C.	£ s. d.
Good carcassing timber	2 2	0
Birch	as 1" F.S.	9
Deal, Joiner's	4	0
2nds	4	0
Mahogany, Honduras	1 3	0
African	1 1	0
Cuban	2 6	0
Oak, plain American	1 0	0
Figured	1 3	0
plain Japanese	1 2	0
Figured	1 5	0
Austrian wainscot	1 6	0
English	1 11	0
Pine, Yellow	1 0	0
Oregon	4	0
British Columbian	4	0
Teak, Moulinein	1 3	0
Burma	1 2	0
Walnut, American	2 3	0
French	2 3	0
Whitewood, American	1 1	0
Deal floorings	18 6	0
" "	1 1	6
" "	1 2	0
" "	1 5	0
" "	1 10	0
Deal matchings	14 0	0
" "	15 6	0
" "	1 4	0
Rough boardings	16 0	0
" "	18 0	0
" "	1 6	0
Plywood, per ft. sup.		
Thickness		
Qualities	A B B B	A B B B
d. d. d. d.	d. d. d. d.	d. d. d. d.
Birch 60 x 48	4 2 1/2	5 3 2 1/2
Cheap Alder	2 1 1/2	3 2 1/2
Oregon Pine	2 1/2	3 2 1/2
Gaboon	4 3 1/2	5 4 1/2
Mahogany	5 4 1/2	7 6 1/2
Figured Oak	7 1/2	10 8 1/2
Scotch glue	lb.	8

## SMITH AND FOUNDER

Tubes and Fittings  
(The following are the standard list prices from which should be deducted the various percentages as set forth below.)

	1"	1 1/2"	2"	2 1/2"	3"	4"	6"	8"	10"	12"
Tubes 2'-14' long per ft. run	4 5 1/2	9 1/2	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4
Pieces, 12'-23' long each	10 1 1/4	1 1/4	2 8	4 9						
3'-11 1/2' long	7 9	1 1/4	1 8	3 1/2						
Long screws, 12'-23 1/2' long	11 1/3	2 1/2	2 10	3 3						
3" M-1 1/2' long	8 10	1 5	1 11	3 6						
Bends	8 11	1 7 1/2	2 7 1/2	5 2						
Springs not socketed	5 7	1 1 1/2	1 11 1/2	3 11						
Socket unions	2 1/2	3 1/2	5 6	6 9	10 1/2					
Elbows, square	10 1 1/4	1 6	2 2	4 3						
Tees	1 1/2	1 3	1 10	2 6	5 1					
Crosses	2 2	2 9	4 1	5 6	10 6					
Plain sockets and nipples	3 4	6	8	1 3						
Diminished sockets	4 6	9	1 1/2	2 1/2						
Flanges	9 1/2	1 4	1 9	2 9						
Caps	3 1/2	5	8	1 1/2	2 1/2					
Backnuts	2 3	5	6	1 1						
Iron main cocks	1 6	2 3	4 2	5 4	11 6					
with brass plugs	4 1/2	7 6	10 1/2	21 1/2						

## DISCOUNTS

	Per cent.		Per cent.
Gas . . .	68 1/2	Galvanized gas .	6
Water . . .	66 1/2	" water .	5
Steam . . .	63 1/2	" steam .	5

## FITTINGS

Gas . . . . .	61 1/2	Galvanized gas . . . . .	55 1/2
Water . . . . .	58 1/2	" water . . . . .	50
Steam . . . . .	53 1/2	" steam . . . . .	46 1/2
			s. d.
Rolled steel joists cut to length . . . . .		cwt. 14	
Mild steel reinforcing rods, 1" . . . . .		" 10	
" " " . . . . .		" 10	
" " " . . . . .		" 10	

## SMITH AND FOUNDER—continued

	per cwt.	s. d.
Mild steel reinforcing rods, 1"	9 6	0
" " "	9 6	0
" " "	9 6	0
" " "	9 6	0
Cast-iron rain-water pipes of ordinary thickness metal	8 10	0
Shoes	2 0	3 0
Anti-splash shoes	4 6	8 0
Boots	3 0	4 0
Bends	2 7	3 9
" with access door	—	6 3
Heads	4 0	5 0
Swan-necks up to 9" offsets	3 9	6 0
Plinth bends, 4 1/2" to 6"	3 9	5 3
Half-round rain-water gutters of ordinary thickness metal	5 6	6
Stop ends	6 6	6
Angles	1 7	1 11
Obtuse angles	2 0	2 6
Outlets	1 9	2 3

## PLUMBER

	per cwt.	s. d.
Lead, milled sheets	38 3	
drawn pipes	37 9	
" soil pipe	40 0	
" scrap	25 9	
Solder, plumbers'	lb.	9
" fine do.	1 0	
Copper, sheet	1 11	
tubes	1 11	
L.C.C. soil and waste pipes:		
Plain cast	1 0	1 2 2 6
Coated	1 1	1 3 2 8
Galvanized	2 0	2 6 4 6
Holderbats	each	3 10 4 0 4 9
Bends	3 9	5 3 10 3
Shoes	2 10	4 4 9 6
Heads	4 8	8 5 12 9

## PLASTERER

	per ton	£ s. d.
Lime, chalk	2 15	0
Plaster, coarse	4 7	6
" fine	3 0	9
Hydrated lime	3 6	0
Sirapite	3 6	0
Keene's cement	3 6	0
Gothite plaster	3 6	0
Pioneer plaster	3 6	0
Thistle plaster	3 6	0
Sand, washed	Y.C.	11 6
Hair	lb.	6
Laths, sawn	bundle	2 4
" rent	lb.	3 9
Lath nails	lb.	3

## GLAZIER

	per sq. ft.	s. d.
Sheet glass, 24 oz., squares n/e 2 ft. s. F.S.	2 1/2	
" " 26 oz.	3 1/2	
Flemish, Arctic, Figures (white)	7 1/2	
Blazoned glasses	2 6	
Reeded: Cross Reeded	11	
Cathedral glass, white, double-rolled, plain, hammered, rimpled, waterwrite	6	
Crown sheet glass (n/e 12" x 10")	2 0	
Flashed opals (white and coloured)	1 0 and 2 0	
1/2" rough cast; rolled plate	6	
1/2" wired cast; wired rolled	10 1/2	
1/2" Georgian wired cast	11 1/2	
1/2" Polished plate, n/e 1 ft.	11 to 11 1/4	
" " 2	12 3 1/2	
" " 4	13 3 1/2	
" " 8	13 11 1/2	
" " 20	13 11 1/2	
" " 45	13 3 1/4	
" " 100	14 0	
Vita glass, sheet, n/e 1 ft.	1 0	
" " 2 ft.	1 3	
" " over 2 ft.	1 9	
" " plate, n/e 1 ft.	1 6	
" " 2 ft.	3 0	
" " 5 ft.	4 0	
" " 7 ft.	5 0	
" " 15 ft.	6 0	
" " over 15 ft.	7 6	
" Calorex " sheet 21 oz., and 32 oz.	2 6 and 3 6	
" " rough cast 1/2" and 1"	8 1/2 and 1 0	
Putty, linseed oil	lb.	3

\* Colours, 1d. F.S. extra.  
† Ordinary glazing quality. ‡ Selected glazing quality.

## PAINTER

	per cwt.	£ s. d.
White lead in 1 cwt. casks	3 4	9
Linseed oil	gall.	3 0
Boiled oil	"	3 3
Turpentine	"	3 9
Patent knotting	"	14 0
Distemper washable	cwt.	2 0 0
ordinary	"	2 0 0
Whitening	"	4 0
Size, double	"	firkin 3 0
Copal varnish	"	gall. 13 0
Flat varnish	"	14 0
Outside varnish	"	16 0
White enamel	"	15 0
Ready mixed paint	"	13 6
Brunswick black	"	7 6

# CURRENT PRICES FOR MEASURED WORK

The following prices are for work to new buildings of average size, executed under normal conditions in the London area. They include establishment charges and

profit. While every care has been taken in its compilation, no responsibility can be accepted for the accuracy of the list. The whole of the information given is copyright.

## EXCAVATOR AND CONCRETOR

Digging over surface n/e 12" deep and cart away	Y.S.	8	9
" to reduce levels n/e 5' 0" deep and cart away	Y.C.	8	6
" to form basement n/e 5' 0" and cart away	"	9	0
" " " 10' 0" deep and cart away	"	9	6
" " " 15' 0" deep and cart away	"	10	0
If in stiff clay	add	"	6
If in underpinning	"	4	0
Planking and strutting to sides of excavation	F.S.	1	0
" " to pier holes	"	5	
" " to trenches	"	5	
" " extra, only if left in	"	3	
Hardcore, filled in and rammed	Y.C.	10	0
Portland cement concrete in foundations (6-1)	"	12	6
" " (4-2-1)	"	12	6
" " underpinning	"	16	0
Finishing surface of concrete, space face	Y.S.	7	

## DRAINLAYER

Stoneware drains, laid complete (digging and concrete to be priced separately)	F.R.	1	6	2	3
Extra, only for bends	Each	2	8	3	9
" " junctions	"	3	9	4	6
Gullies and gratings	10	6	18	0	
Cast iron drains, and laying and jointing	F.R.	4	9	6	9
Extra, only for bends	Each	10	6	15	6

## BRICKLAYER

Brickwork, Flettons in lime mortar	Per Rod	£	s.	d.
" " in cement	"	27	12	6
" Stocks in cement	"	34	6	0
" Blues in cement	"	50	0	0
Extra only for circular on plan	"	2	0	0
" backing to masonry	"	1	10	0
" rising on old walls	"	2	0	0
" underpinning	"	5	10	0
Fair Face and pointing internally	F.S.	12		
Extra over fletton brickwork for picked stock facings and pointing	"	8		
" " " blue brick facings and pointing	"	1	4	
" " " glazed brick facings and pointing	"	3	6	
Tuck pointing	"	7	8	
Weather pointing in cement	"	3		
Slate dampcourse	"	10		
Vertical dampcourse	"	1	1	

## ASPHALTER

1/2" Horizontal dampcourse	Y.S.	4	9
1/2" Vertical dampcourse	"	7	9
1/2" paving or flat	"	6	3
1" paving or flat	"	7	6
1" x 6" skirting	F.R.	1	0
Angle fillet	"	2	8
Rounded angle	"	2	4
Cesspools	Each	5	0

## MASON

Portland stone, including all labour, hoisting, fixing and cleaning down, complete	F.C.	17	9
Bath stone and do., all as last	"	13	6
Artificial stone and do.	"	13	0
York stone templates, fixed complete	"	10	6
" thresholds	"	13	6
" sills	"	1	0

## SLATER AND TILER

Slating, Bangor or equal to a 3" lap, and fixing with compo nails, 20" x 10"	Sqr.	3	10	0
Do., 18" x 9"	"	3	7	0
Do., 24" x 12"	"	3	17	0
Westmorland slating, laid with diminished courses	"	6	8	0
Tiling, best hand made sand-faced, laid to a 4" gauge, nailed every fourth course	"	3	0	0
Do., all as last, but of machine-made tiles	"	2	10	0
20" x 10" medium Old Delabole slating, laid to a 3" lap (grey)	"	2	16	0
" " " " " (green)	"	4	15	0

## CARPENTER AND JOINER

Flat boarded centering to concrete floors, including all strutting	Sqr.	£	s.	d.
Shuttering to sides and soffits of beams	F.S.	7		
" to stanchions	"	7		
" to staircases	"	1	6	
Fir and fixing in wall plates, lintols, etc.	F.C.	3	9	
Fir framed in floors	"	4	6	
" " roofs	"	6	6	
" " partitions	"	8	6	
1/2" deal sawn boarding and fixing to joists	Sqr.	1	14	6
1/2" " " " " " "	"	1	17	6
1/2" x 2" fir batten for Countess slating	"	2	3	0
Do., for 4" gauge tiling	"	9	6	
Stout feather-edged tilting fillet	F.R.	12	0	
Patent inodoriferous felt, 1 ply	Y.S.	2	3	
" " " 2 "	"	2	9	
" " " 3 "	"	3	3	
Stout herringbone strutting to joists	F.R.	10	4	
1" deal gutter boards and bearers	F.S.	1	2	
2" deal wrought rounded roll	F.R.	1	6	
1" deal grooved and tongued flooring, laid complete, including cleaning off	Sqr.	2	10	0
1/2" do.	"	2	10	0
1/2" do.	"	2	17	0
1" deal moulded skirting fixed on, and including grounds plugge to wall	F.S.	1	6	
1/2" do.	"	1	9	

## CARPENTER AND JOINER—continued

1 1/2" deal moulded sashes of average size	F.S.	1	9
2" " " " " " " "	"	1	11
1 1/2" deal cased frames double hung, of 6" x 3" oak sills, 1 1/2" pulley stiles, 1 1/2" heads, 1" inside and outside linings, 1 1/2" parting beads, and with brass faced axle pulleys, etc., fixed complete	"	3	7
2" " " " " " " "	"	3	10
Extra only for moulded horns	Each	3	6
1 1/2" deal four-panel square, both sides, door	F.S.	2	0
2" " " " " " " "	"	2	8
1 1/2" " " but moulded both sides	"	2	4
2" x 3" deal, rebated and moulded frames	F.R.	3	0
4 1/2" x 3 1/2" " " " " " "	"	1	0
1 1/2" deal tongued and moulded window board, on and including deal bearers	F.S.	1	9
1 1/2" deal treads, 1" risers in staircases, and tongued and grooved together on and including strong fir carriages	"	2	6
1 1/2" deal moulded wall strings	"	2	1
1 1/2" " " " " " " "	"	2	1
Ends of treads and risers housed to string	Each	2	13
3" x 2" deal moulded handrail	F.R.	1	9
1" x 1" deal balusters and housing each end	Each	2	0
1 1/2" x 1 1/2" " " " " " "	"	2	9
3" x 3" deal wrought framed newels	F.R.	1	3
Extra only for newel caps	Each	6	0
Do., pendants	"	6	0

## SMITH AND FOUNDER

Rolled steel joists, cut to length, and hoisting and fixing in position	Per cwt.	£	s.	d.
Riveted plate or compound girders, and hoisting and fixing in position	"	1	0	6
Do., stanchions with riveted caps and bases and do.	"	19	0	0
Mild steel bar reinforcement, 1/2" and up, bent and fixed complete	"	17	6	
Corrugated iron sheeting fixed to wood framing, including all bolts and nuts 20 g.	F.S.	11		
Wrought-iron caulked and cambered chimney bars	Per cwt.	1	10	0

## PIUMBER

Milled lead and labour in flats	cwt.	£	s.	d.
Do. in flashings	"	2	8	9
Do. in covering to turrets	"	2	13	3
Do. in soakers	"	2	3	6
Labour to welded edge	F.R.	3	4	
Open copper nailing	"	3		
Close	"	4		
Lead service pipe and fixing with pipe hooks	F.R.	1	0	1
Do. soil pipe and fixing with cast lead tacks	"	6	6	
Extra, only to bends	Each	2	0	0
Do. to stop ends	"	1	0	
Boiler screws and unions	"	3	3	3
Lead traps	"	3	9	5
Screw down bib valves	"	6	9	9
Do. stop cocks	"	7	0	9
4" cast-iron 1/4-rd. gutter and fixing	F.R.	1	0	
Extra, only stop ends	Each	1	0	
Do. angles	"	1	6	
Do. outlets	"	2	9	
4" dia. cast-iron rain-water pipe and fixing with ears cast on	F.R.	1	2	
Extra, only for shoes	Each	1	3	
Do. for plain heads	"	5	6	

## PLASTERER AND TILING

Expanded metal lathing, small mesh	Y.S.	2	0	
Do. in n/w to beams, stanchions, etc.	"	2	9	
Lathing with sawn laths to ceilings	"	1	3	
1/2" screeding in Portland cement and sand or tiling, wood block floor, etc.	"	1	5	
Do. vertical	"	1	7	
Rough render on walls	"	1	2	
Render, float and set in lime and hair	"	1	9	
Render and set in Sirapite	"	1	11	
Render, backing in cement and sand, and set in Keene's cement	"	2	9	
Extra, only if on lathing	"	4		
Keene's cement angle and arris	F.R.	6		
Arris	"	1	8	
Rounded angle, small	"	3		
Plain cornices in plaster, including dubbing out, per 1" girth	"	1	8	
1" granolithic pavings	Y.S.	3	6	
1 1/2" x 6" white glazed wall tiling and fixing on prepared screed	"	4	6	
9" x 3" " " " " " "	"	17	6	
Extra, only for small quadrant angle	F.R.	1	2	8

## GLAZIER

21 oz. sheet glass and glazing with putty	F.S.	£	s.	d.
26 oz. do. and do.	"	7	8	
Flemish, Arctic Figured (white) and glazing with putty	"	1	1	
Cathedral glass and do.	"	1	2	
Glazing only, British polished plate	"	7		
Extra, only if in beds	"	2		
Washleather	F.R.	4		

## PAINTER

Clearcolle and whiten ceilings	Y.S.	£	s.	d.
Do. and distemper walls	"	9		
Do. with washable distemper	"	1	1	
Knot, stop, prime and paint four coats of oil colour on plain surfaces	"	3	3	
Do. on woodwork	"	3	6	
Do. on steelwork	"	3	6	
Do. and brush grain and twice varnish	"	5	6	
Stain and twice varnish woodwork	"	1	11	
Stain and wax polish woodwork	"	4	6	
French polishing	F.S.	1	2	
Stripping off old paper	Piece	2	0	
Hanging ordinary paper	from	2	0	